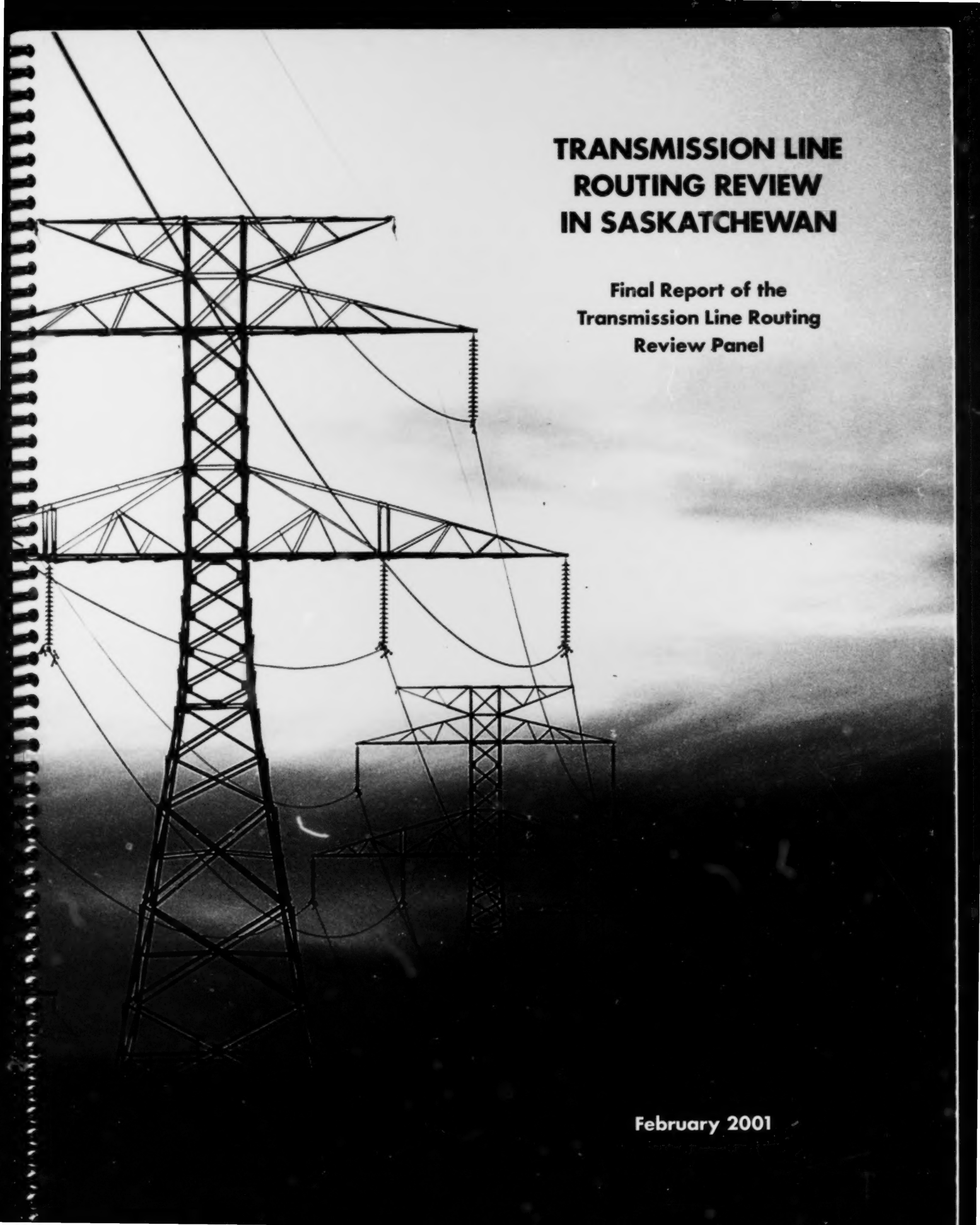

TRANSMISSION LINE ROUTING REVIEW IN SASKATCHEWAN

Final Report of the Transmission Line Routing Review Panel

February 2001

TRANSMISSION LINE ROUTING REVIEW PANEL

A PANEL ESTABLISHED TO REVIEW SASKPOWER'S TRANSMISSION LINE ROUTING PROCEDURES

DR. WAYNE CLIFTON, P.ENG., CHAIR • FRED SUTTER • DR. DAVID GAUTHIER, PH.D

14 February 2001

Mr. John Wright
President & CEO
SaskPower Corporation
2025 Victoria Avenue
Regina, Saskatchewan
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Dear Sir:

It is our pleasure to submit to you the Final Report of the Transmission Line Routing Review Panel.

In accordance with our Terms of Reference, we have provided recommendations on how SaskPower may improve its current procedures for planning and constructing electrical transmission facilities in Saskatchewan.

Our recommendations are based on extensive stakeholder consultations, examination of procedures used in other jurisdictions and a review of relevant literature and directly address concerns brought to the panel during the consultation process.

Respectfully submitted,

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Table of Contents

Table of Contents i

Executive Summary vii

E.1 Introduction vii
E.2 Electrical Industry Issues vii
E.3 Current Transmission Project Implementation viii
E.4 Comparison with Regional Electrical Utilities x
E.5 Public and Corporation Concerns xiii
E.6 Issues and Recommendations xiv
E.6.1 Policy Framework xiv
E.6.2 Planning Framework xv
E.6.3 Public Consultation xvi
E.6.4 Preparing the Corporation xvi
E.6.5 Corridor Selection and Evaluation xvii
E.6.6 Landowner Relationship xviii
E.6.7 Technical Issues xviii
E.6.8 Implementing Projects Currently in Abeyance xxi
E.7 Closure xxi
E.8 Expression of Appreciation xxii

Section 1 Introduction 1

1.1 Background 1
1.2 Terms of Reference 1
1.3 Panel Activities 2
1.4 Acknowledgements 2

Section 2 Electrical Transmission in Saskatchewan 3

2.1 Defining Transmission Facilities 3
2.2 Historical Overview 7
2.2.1 1920s - 1950 7
2.2.2 1950 to Present 7
2.3 The Future 8

Section 3 Legislative and Regulatory Framework 9

3.1 Environmental Policy .9
3.2 Organizational Overview .10
3.3 Legislative Overview .11
3.3.1 Power Corporation Act .11
3.3.2 Environmental Assessment Act .11
3.3.3 Guidelines for Environmental Protection from the Development of Electrical Transmission Lines .12
3.3.4 Environmental Management and Protection Act .13
3.3.5 The Planning and Development Act .13
3.3.6 The Expropriation Procedure Act .14
3.3.7 The Canadian Environmental Assessment Act .14

Section 4 SaskPower's Current Project Delivery Model 17

4.1 SaskPower Approval and Construction Process .17
4.1.1 Evaluation of Need for New Facilities .17
4.1.2 Internal Approval of New Transmission Facilities .17
4.1.3 Establishing the Study Area .17
4.2 Constraint Identification .18
4.2.1 Environmental Constraints .18
4.2.2 Engineering Constraints .18
4.2.3 Facility Constraints .18
4.3 Corridor Option Identification .20
4.4 Public Participation .20
4.4.1 First Round Open House Meetings (Project Dependent) .20
4.4.2 Second Round Open House Meetings (Project Dependent) .20
4.5 Regulatory Submissions (Project Dependent) .20

Section 5 Benchmarking 25

5.1 Purpose .25
5.2 Results .25
5.2.1 Manitoba .25
5.2.1.1 General .25
5.2.1.2 Technical Overview .26
5.2.1.3 Manitoba Regulatory Process .26
5.2.2 Alberta .31
5.2.2.1 General .31
5.2.2.2 Technical Overview .31
5.2.2.3 Regulatory System Description .33
5.2.2.4 Implementation Process .36
5.2.2.5 Construction and Maintenance .41
5.2.2.6 Reclamation .44
5.2.3 North Dakota .45
5.2.3.1 General .46
5.2.3.2 Regulatory Overview .46

5.2.4 Minnesota 52
5.2.4.1 General 52
5.2.4.2 Regulatory Overview 52
5.2.4.3 Implementation 52
5.2.4.4 Minnesota Power 54
5.2.5 Oregon 55
5.2.5.1 General 55
5.2.5.2 Regulatory Process 55
5.2.5.3 Implementation 55
5.2.5.4 Bonneville Power Administration 57
5.2.6 Colorado 59
5.2.6.1 General 59
5.2.6.2 Regulatory Process 59
5.2.6.3 Implementation 60
5.2.6.4 Tri-State Generation and Transmission Association 60
5.3 Benchmarking Comparison 61
5.3.1 Public Consultation 61
5.3.2 Project Development Schedule 62
5.3.3 Regulatory Framework 63
5.3.4 Study Area and Corridor Selection 63
5.3.5 Needs Assessment 63
5.3.6 Technical Criteria 63
5.3.7 EMF Considerations 64
5.3.8 Expropriation 64
5.3.9 Summary 64

Section 6 Public and Corporate Concerns 65

6.1 Opinions Heard by the Panel 65
6.1.1 The Need for Transmission Projects 65
6.1.2 Respect for Technical Competence 65
6.1.3 Landowner Concerns 65
6.1.4 Other Stakeholder Concerns 66
6.1.5 Relationship with Regulators 66
6.1.6 Relationship with Communities 66
6.1.7 Relationship with Municipal Officials 66
6.1.8 Public Consultation and Willingness to Consider Alternatives 66
6.1.9 Recognition of Intrinsic Land Values 67
6.1.10 SaskPower Values and Policy 67
6.1.11 Electric and Magnetic Fields (EMF) 67
6.1.12 Expropriation and the Willingness to Negotiate 67
6.1.13 Clearance Standards and Guidelines 68
6.1.14 Maintenance of Urban Facilities 68
6.1.15 Changing Business Environment 68
6.1.16 Unrecognized Mitigation Measures 68
6.1.17 Transmission Line Economics 69
6.1.18 Dealing with Planned Lines Currently in Abeyance 69
6.1.19 Influence of SERM Guidelines 69
6.1.20 Long-Term Planning 69
6.2 Current Project Delivery Model 69

Section 7 Issues and Recommendations 71

7.1 Policy Framework .71
7.1.1 Corporate Values and Environmental Policy .71
7.1.2 SERM Transmission Line Routing Guidelines .71
7.1.3 SaskPower Environmental Management Policy .73

7.2 Planning Framework .73
7.2.1 The 10 year Load Growth Forecast .73
7.2.2 The 5 year Capital Project Forecast .73
7.2.3 Urban Fringe Areas .74
7.2.4 Relationships with Major Urban Parks .74
7.2.5 Highways and Utilities .74
7.2.6 The Tourism Industry .75

7.3 Public Consultation .75
7.3.1 The Concept of Community .75
7.3.2 The Public Participation Process .76
7.3.3 Consultation with Local Governments .77
7.3.4 Scheduling Public Consultation .77

7.4 Preparing the Corporation .78
7.4.1 Preparing the Corporation to Support the Routing Process .78
7.4.2 Staff Assignment and Training .78

7.5 Corridor Selection and Evaluation .79
7.5.1 Corridor Selection .79
7.5.2 The Corridor Assessment Process .80

7.6 Landowner Relationships .83
7.6.1 Landowner and Stakeholder Contact .83
7.6.2 Resolving Landowner Disputes .83
7.6.3 Right-of-Way Acquisition .83
7.6.4 Minimizing the Number of Affected Landowners .83
7.6.5 Who Should Pay? .84

7.7 Technical Issues .84
7.7.1 Electric and Magnetic Fields Effects on Human Health .84
7.7.2 Clearance and Right-of-Way Standards .85
7.7.3 Urban Right-of-Way Maintenance .85
7.7.4 Aesthetics .85

7.8 Projects Currently in Abeyance .86

Section 8 Closure 87

8.1 Future Directions .87
8.2 Expression of Appreciation .88

Appendix A	Panel Biographies	89
Appendix B	Terms of Reference	91
Appendix C	Media Release	93
Appendix D	Panel Activities	95
Appendix E	Panel Advertisement and Letters of Invitation for Participation	97
Appendix F	Contacts	101
Appendix G	SERM Guidelines	107
Appendix H	Definitions	133
Appendix I	Bibliography	139

Executive Summary

E.1 Introduction

The electrical transmission system in Saskatchewan is a reliable network that has been implemented by SaskPower over the last seven decades, and in the process SaskPower has developed progressive routing, design, and construction procedures. Increased emphasis has been placed on environmental issues during the last two decades, including extensive interaction with the public whenever new transmission facilities were proposed. Recognizing the progressively changing social values and public attitudes towards transmission line routing, SaskPower commissioned a Panel of three persons to review its current policies for transmission line routing and to provide recommendations to optimize routing policies for future transmission projects.

The Panel operated independently from SaskPower and consulted with various stakeholder groups to solicit advice on routing guidelines. It consulted with similar utilities in nearby jurisdictions to benchmark current practices in the region.

The Panel was at liberty to gather views, opinions, or other information in any fashion that it saw fit. Information was gathered from meetings, written and electronic mail submissions, and individual conversations. The interpretation of this information, identification of issues, and the recommendations presented in the report flow from these consultations.

E.2 Electrical Industry Issues

Construction and operation of the electrical transmission system in Saskatchewan is currently a legal monopoly that is coming under increasing pressure as the demand for "merchant" lines increases to feed the deregulated North American Energy System. In Saskatchewan, it is also a natural monopoly created by the vast land area, low population density, and widely dispersed loads. This natural monopoly will probably persist for some time, since there are few identifiable forces that will tend to disrupt it.

Electrical energy transmission is a wired industry, relying on conductors supported by above-ground structures. This means a physical presence on land, and the landowners who host the transmission corridors are involuntary participants in providing electrical transmission facilities. A number of other stakeholders who value elements of the landscape, the biophysical environment, or the socio-economic conditions within their community may also be involuntarily impacted. Combined with a growing *"not in my back yard"* syndrome, this has increased the sensitivity of landowners who, in concert with other stakeholders, have the potential to form strong anti-project alliances. While Saskatchewan law does not permit a landowner to refuse right-of-way (but simply to negotiate compensation), the co-joined landowner-environmental stakeholder interest has demonstrated itself to be effective in delaying transmission projects in some jurisdictions.

On the other hand, competitive pressures resulting from continental deregulation of energy generation and transmission will require SaskPower to react to changing customer demands in an ever more flexible and timely fashion. In previous decades, new generation was owned by the corporation,

could be sited in a convenient and economical location, and could be tied into the network, allowing a 4 to 5 year schedule for construction and commissioning. Current cogeneration projects may be on line in two years or less. Hence, the current project delivery schedule is not aligned with commercial imperatives. Public and landowner skepticism and resistance are increasing at a time when commercial pressures require greater flexibility and certainty of implementation; hence, this review of policies and processes was essential to assist SaskPower in adapting to the changing environment.

E.3 Current Transmission Project Implementation

Network Development is the SaskPower management unit that has the responsibility of identifying transmission needs within the province and setting the transmission reinforcement program. The principal inputs to establishing the transmission improvement program include:

- a rolling *10 year* technical load forecast that predicts load growth within the province;
- a rolling *5 year* capital project program that identifies the financial requirements to improve the transmission network.

The usual trigger for transmission reinforcement is either development of a new industry, addition of new generation, or the forecast of apparatus overloads or voltage collapse (low voltage) due to load growth on the system. When a potential need is identified, in addition to evaluating reinforcement alternatives involving the construction of new line, Network Development will review alternatives to building a new line including:

- technical voltage control using devices such as capacitors;
- implementation of local generation to support peak loads;
- load management to match the load to available transmission capacity; and
- replacement of existing single circuit transmission lines with double circuit transmission lines (minimizing the requirement for new right-of-way).

Capital costs for alternatives involving construction of line or station facilities are obtained from SaskPower's Lines and Stations Engineering Group. In establishing capital project cost estimates, Lines and Stations uses available engineering and environmental information. Network Development selects the preferred alternatives on the basis of the least evaluated cost over the expected life span of the project. The cost factors considered include:

- capital;
- applicable taxes;
- reduction in revenue for load management options;
- incremental fuel cost for local generation options;
- ongoing operation and maintenance costs;
- annual credit for reduced energy losses in transmission; and
- credit for reduction in capacity losses associated with transmission.

Once Network Development determines the preferred alternative, it prepares a report and recommendation. Network Development then seeks capital project authorization (CPA) on the basis of the engineering capital estimate that incorporates appropriate contingencies for unforeseen project modifications that may be needed to address future engineering or environmental issues that may arise. SaskPower's vice-president of Transmission and Distribution is generally the approving authority for the CPA.

With the CPA in hand, project management responsibility then shifts to Engineering

(Lines and Stations) for implementation. A multi-disciplinary team with skills dictated by project requirements is assembled. The project team typically includes SaskPower representatives from:

- Communications;
- Land;
- Operations;
- Environmental Programs;
- Engineering; and
- Network Development.

Consultants may be hired to provide some services.

Engineering establishes the boundaries of the study area within which potential corridors may be located. Environmental, cultural and facilities constraints are outlined using available information and current clearance criteria. Potentially viable corridors are laid out and presented to the project team, but a preferred route is not recommended.

Environmental Programs provides environmental screening information as input to corridor selection, routing studies, and capital cost estimates. It is responsible for conducting environmental screening of all projects and will prepare the project proposal that is used by Saskatchewan Environment and Resource Management (SERM) to decide if the provisions of *The Environmental Assessment Act* will apply. Under the Act (SERM 1996a), *environment* means:

i) air, land and water;

ii) plant and animal life, including man; and

iii) the social, economic and cultural conditions that influence the life of man or a community insofar as they are related to the matters described in subclauses i) and ii).

Under *The Environmental Assessment Act* (SERM 1996a), an Environmental Impact Assessment (EIA) will be required on a transmission line project if it is likely to:

i) have an effect on any unique, rare or endangered feature of the environment;

ii) substantially utilize any provincial resource and in so doing preempt the use, or potential use, of that resource for any other purpose;

iii) cause the emission of any pollutants or create by-products, residual or waste products which require handling and disposal in a manner that is not regulated by any other Act or regulation;

iv) cause widespread public concern because of potential environmental changes;

v) involve a new technology that is concerned with resource utilization and that may induce significant environmental change; or

vi) have a significant impact on the environment or necessitate a further development which is likely to have a significant impact on the environment.

Transmission line corridors are specifically identified in SERM's policy document "The Saskatchewan Environment Assessment and Review Process" (SERM, 1996b) as a typical project type for which an Environment Impact Assessment is likely required.

Environmental Programs is responsible for conducting the project screening and preparation for the project proposal for submission to SERM. The objective is to gain approval for a corridor with a typical width of 200 m to 1,600 m within which the transmission line route would be finally selected. As part of these activities, a public participation process is normally initiated and includes advertisements, media interviews, open houses, and stakeholder visits of sufficient scope to advise stakeholders of the project and to assess public reaction and determine if *widespread pub-*

lic concern exists. The first formal contact with landowners normally occurs at this time when a letter is sent to each inviting them to a project open house. Public involvement is not a legal requirement during the project proposal stage.

After completing a review of the project proposal, SERM decides whether or not an EIA is required based on the six criteria listed above. If an EIA is deemed necessary, then biophysical characterization and increased public participation will be required. Biophysical characterization may require multiple season data collection. Considering that completion of the environmental assessment process and licensing stage normally requires at least 18 months to complete, it is imperative that biophysical characterization be carefully scheduled in order to prevent delays.

Following the open house, land officers contact landowners and become the primary contact between the landowners and the corporation. They maintain ongoing contact and are responsible for negotiation of land access for the project. A representative of Environmental Programs is the primary contact between stakeholders and the corporation for matters related to environmental assessment, while the Lines and Stations Engineering Group is responsible for obtaining licenses and permits from all other agencies.

When provincial and municipal approvals and permits are in place, Engineering Group completes detailed location and design. Two types of modifications may be incorporated during detailed design:

- modifications negotiated with landowners and which have an acceptable capital cost; and
- modifications required to mitigate environmental impacts, or that have been ordered by the regulators.

The approved design will be constructed and turned over to Operations, which maintains an ongoing interaction with landowners through line patrols that require full access along the right-of-way. Environmental Programs may also have a continuing responsibility if environmental monitoring or mitigative measures are required.

E.4 Comparison with Regional Electrical Utilities

The Panel visited a number of electrical utilities in jurisdictions adjoining Saskatchewan and had in-depth discussions with two others for the purpose of comparing transmission line routing processes. Manitoba and Alberta were visited in Canada, along with North Dakota and Minnesota in the United States. Oregon and Colorado were also benchmarked through document reviews and telephone interviews, but these states were not visited.

The principal issues identified during the benchmarking are summarized in Table E1. This table identifies project planning issues and public consultation as areas where there were significant variances. In technical design, construction, and maintenance, there was a high degree of congruence among the various utilities.

There is a significant variance in the method of determining clearances and right-of-way widths in different jurisdictions. The United States utilities use criteria laid out by the United States Department of Agriculture (Government of the United States 1992) which generally results in clearances greater than those prescribed by Canadian Standards Association (CSA) criteria (CSA 1997). Manitoba and Alberta both apply the clearances and right-of-way standards described in CSA Standard C22-3 No. 1-M87 to define minimum safe clearances for transmission lines. For some projects, Alberta utility companies utilize more stringent clearance criteria than the CSA standards. SaskPower uses the CSA clearance standard to define right-of-way widths and minimum clearances, but has a recommended building clearance described in its guideline EG2-1961 (SaskPower 1961). In addition, SaskPower has an informal design guideline which attempts to achieve a separation of up to 160 m (depending on line size), between dwellings or occupied buildings in rural areas.

Table E1
Benchmarking Comparison

Issue	SaskPower	Alberta	Manitoba	U.S. Jurisdictions
1. Demonstration of Need	No formal requirement demonstrated in project proposal.	Need Statement is required in initial application.	Need is demonstrated early in process. No formal requirement.	'Certificate of Need' requested in early stage for transmission projects. For smaller project demonstration of need may not be needed.
2. Project Proposal	Required for transmission lines.	Required for transmission projects. Submitted to Transmission Administrator.	'Workplan' required for transmission projects.	Project description is included in 'Certificate of Need' application.
3. Public Consultation	Usually part of project proposal. Required as part of Environmental Impact Assessment.	Proponent is expected to consult with landowners within 800 m of line.	Required in accordance with legislation. Participation encouraged at all key steps.	Generally required throughout all phases of project. Public hearings required for larger projects.
4. Environmental Impact Assessment	Ministers Decision. Typically required for lines 230 kV and over. May be required for smaller transmission lines.	Mandatory for line 500 kV and above; excluded for lines 130 kV and less; discretionary for line 130–500kV.	Classes of Development Regulations. EIA required for lines above 115 kV. Discretionary for lines less than 115 kV	Highly variable between states. Below 69 kV is not transmission and EIA not required. Above 69 kV EIA may be required.
5. Project Schedule (Announcement to Approval)	Usually less than one year.	Normally about 1 year but greater for larger projects.	About 2 years. More time may be required for large projects.	2 to 5 years or more.
6. Line Design Criteria	Professional engineers using Canadian Codes and Standards.	Professional engineers using Canadian Codes and Standards.	Professional engineers using Canadian Codes and Standards	National Electrical Code requirements.
7. Clearance to Dwellings	SaskPower guideline EG2–1961 is recommended in rural areas. CSA 22–3 No. 1–M87 defines minimum in rural and urban areas.	CSA 22–3 No. 1–M87 at a minimum. Utilities use clearances that may be greater than CSA.	CSA 22–3 No. 1–M87.	US Department of Agriculture 1724–200.
8. Expropriation Policy	Last Resort.	Last Resort.	Last Resort.	Last Resort.
9. Published Environmental Standards	Standards criteria do exist and are included in all projects and described in work plans and EIS. Not formally published.	Yes.	Standards criteria do exist and are included in all projects and described in work plans and EIS. Not formally published.	Standards criteria do exist and are included in all projects and described in work plans and EIS. Not formally published.
10. EMF Management	Keep up with current research. Will do measurements for homeowners.	No formal program. Landowners are provided with information and measurements if requested. Information is also provided in public consultation stages.	Keep up with current research. Hire experts to provide predictions for new projects. Will do measurements for homeowners.	Keep up with current research. Will do measurements for homeowners. Information on EMF required in public hearings.

Table E2
Horizontal Clearances to Buildings

Nominal Line Voltage (kV)	USDA Criteria (m)		CSA Criteria (m)			SaskPower Recommended Clearance With Conductor Swing (m)
	Minimum Clearance Without Conductor Swing	Right-of-Way	Minimum Clearance Without Conductor Swing	Minimum Clearance With Conductor Swing[1]	Right-of-Way[2] (m)	
34.5–69	3.0	22–30	—	—	—	—
72	—	—	1.8	6.1–12.3	15–30	30.5
115	3.3	30	—	—	—	—
138	3.4	30–45	2.2	4.7–15.2	15–40	45.7
161	3.5	30–45	—	—	—	—
230	4.0	40–60	2.8	5.8–13.7	30–40	61.0

[1]Right-of-Way and Minimum Clearances vary depending on line design specifications
[2]SaskPower applies CSA criteria for determining right-of-way widths.

Table E2 summarizes right-of way widths and clearances to buildings.

Most United States jurisdictions require that the proponent of a transmission line demonstrate the need for the line. Some of these are public processes, such as in North Dakota, where hearings may be held annually to update the inventory of potential sites and corridors for transmission facilities. Processes in Alberta, Manitoba, and Saskatchewan are more informal and rely on the proponent to demonstrate need in the project proposal or work plan submitted as an administrative procedure under applicable Environmental Acts.

In the transparency of the overall transmission network planning and identification of transmission reinforcement projects, Saskatchewan differs considerably from other jurisdictions. Some United States utilities exist in a deregulated market and are required to regularly update the public on the condition of the transmission network and plans to improve it. Manitoba and Alberta utilities also engage the public during the planning process. In Saskatchewan, load forecasting, identification of upcoming deficiencies, system reliability, and needed reinforcements are internal processes to SaskPower and are not routinely published. The public sees only the result of this work as individual projects are announced and submitted for assessment under *The Environmental Assessment Act*.

The degree of scrutiny during the assessment phase also varies among jurisdictions particularly within the United States. Some states are required to complete environmental impact assessments for transmission lines greater than 69 kV, particularly if they involve federal land or resources. However, there are some exceptions to this. Minnesota, for example, conducts environmental impact assessments for transmission lines that are 200 kV or greater and at least 80 km in length, and for lines 300 kV or greater and at least 40 km in length. For transmission lines that do not meet these criteria, completion of an EIA is discretionary. In Alberta, it is mandatory to complete an EIA for transmission lines greater than 500 kV. Lines below 130 kV are exempted from the EIA process and lines between 130 kV and 500 kV are discretionary. In Manitoba, The Classes of Development Regulations (Government of Manitoba 1988a), and *The Environment Act* (Government of Manitoba 1987), set out the requirements for whether or not an EIA is required. Generally, however, it is the Department of Conservation that determines whether or not an EIA is required, based on potential environmental impacts.

In Saskatchewan, the decision as to whether or not an EIA is required is made by the Minister of Environment under provisions of *The Environmental Assessment Act*. It is made after a review of the project proposal and discussion of the project with the public and their representatives. Common triggers would be line voltage and public concern.

All jurisdictions value their relationships with landowners, trying to reach negotiated settlements wherever possible. All have the power of expropriation of right-of-way, but use it only when other solutions fail.

The time required to implement a transmission project varies depending on jurisdiction, project sensitivity and complexity, and other factors. It is the general view that transmission projects always take longer and cost more than was initially planned. The United States jurisdictions suggested two to five years as a reasonable time expectation for project assessment and permitting, while Manitoba and Alberta suggested one to two years for smaller projects and longer for larger, more complex projects. SaskPower has generally been operating at the lower end of that scale, allowing one year or less for smaller, straightforward projects and longer for more complex, larger projects.

E.5 Public and Corporation Concerns

The Panel was briefed on existing processes by SaskPower personnel before undertaking a series of consultations with external stakeholders. Additional detailed consultations were then undertaken with SaskPower as follow-up to gain a comprehensive understanding of the project planning, design, corridor selection, assessment, and approval processes.

SaskPower identified a number of issues related to the traditional project delivery model built around the historical practices of the corporation. It is a model based on the SaskPower monopoly, supported by the authority to plan and implement projects as provided in *The Power Corporation Act* (Government of Saskatchewan 1998) supplemented by *The Expropriation Procedure Act* (Government of Saskatchewan 1968). These powers have been somewhat mitigated since 1980 when *The Environmental Assessment Act* was proclaimed, bringing environmental considerations into the process. The focus of the corporation has been to provide a technically and environmentally acceptable, economical, and reliable transmission system in the shortest possible time. This focus has brought it into conflict with some members of the public.

The essence of the view conveyed to the Panel is provided in the main report. The concerns were varied and included:

- The public remains largely uninformed as to why transmission reinforcements are needed and what alternatives are considered in making the decision to construct a transmission line.
- Many historical landowner concerns remain, including those related to economic loss, relationship between landowners and the corporation, environmental management standards applied to rights-of-way, and long-term impacts of corridor development on the communities.
- The relationship between SaskPower and Saskatchewan Environment and Resource Management was not perceived to be at arms-length, giving some members of the public little comfort that there was an independent agency protecting public interests.
- SaskPower may be interpreting too literally certain SERM guidelines, thereby limiting flexibility in routing decisions (e.g., the guideline giving preference to routing on existing road allowances and rights-of-way).
- SaskPower has a responsibility to "respect community stewardship values" and take these into account in their routing decision.
- Local governments perceive that they are ancillary to the transmission line routing processes and are not convinced

that their interests are being fully protected.

- The current public consultation process is not configured to get meaningful community input regarding route selection. Concerns were expressed with respect to the style of consultation and the lack of adequate time for meaningful discussions.
- Some land has "intrinsic value" beyond its economic value on the basis of its productive capacity.
- Tourism is a growing part of the Saskatchewan economy and features the uncluttered provincial landscape as a marketing focus. The tourism industry identified a desire to be consulted about transmission line routing since their industry may be the significantly impacted by some transmission projects.
- Socio-economic considerations are absent from SaskPower's value statements and environmental policies.
- Current SaskPower routing processes are excellent with respect to technical delivery and protection of the biophysical environment.
- SaskPower routing processes should consider the full range of social and economic factors that will impact the affected communities.
- Electric and magnetic fields and their potential effects on human health.
- Transmission line clearances and the width of rights-of-way.
- Maintenance of urban rights-of-way.
- Rights-of-way acquisition policies and evaluation of impacts of diagonal crossings on agricultural land.
- The changing business environment wherein SaskPower must be prepared to fully participate in the deregulated national electric energy transmission system.
- The ongoing need to provide the most economical and reliable power to Saskatchewan industry and consumers.
- Relationships with urban municipalities and the major urban parks involved in long-term planning of utility corridors.
- The lack of public recognition for the corporation's current efforts to mitigate the impacts of new transmission projects.
- The question of who should pay the cost of the physical presence of power lines: the long-term user or the landowner?
- The impact of SERM guidelines on route location decisions.
- Openness and transparency in the long-range planning functions.
- Dealing with transmission projects currently held in abeyance.

The Panel considered all the information brought to it and formulated the recommendations discussed in the next section.

E.6 Issues and Recommendations

The Panel's consideration of information gathered from the corporation, panel participants, and during benchmarking resulted in a series of recommendations summarized in the following sections.

E.6.1 Policy Framework

Policy issues revolve around SERM routing guidelines and SaskPower's environmental policy. The Panel examined these issues and recommended enhancements to each.

Electrical transmission will remain a wired industry, dependent on physical occupation of land. A harmonious relationship with

landowners is strategic to SaskPower's long-term interests. Similarly, SaskPower values community relationships, but current environmental policy does not focus on "the socio-economic and cultural conditions that influence the life of man or community."

The Panel recommends that SaskPower revisit its value statements and environmental policy to recognize the importance of the full range of community and socio-economic values in effective environmental management.

The influence of the SERM transmission line routing guidelines on the selection of transmission line corridors was reviewed.

The Panel recommends that this guideline be amended and that specific clauses with respect to unique areas and landscapes, urban parks, and tourist facilities be added.

SaskPower has environmental protection policies and procedures in place for the development and operation of transmission projects. These policies and procedures do not appear to be well-known by the public. The public, especially landowners who must host SaskPower installations, expect to have corporate practices clearly defined before they enter into transactions with the corporation.

The Panel recommends that SaskPower formalize and adopt comprehensive environmental protection guidelines that would meet or exceed current regulatory requirements governing practices in location, design, construction, and maintenance of the transmission network in Saskatchewan.

E.6.2 Planning Framework

While the 10 year load forecast and the 5 year capital program are currently internal documents, there is considerable value in making these public as an integral part of the long-term planning process.

The Panel recommends that the corporation annually publish a 10 year forecast of load growth that:

1) **assesses the system reliability;**

2) **identifies upcoming deficiencies; and**

3) **outlines the general plan of improvements to address them.**

It is also recommended that the corporation annually publish a detailed and comprehensive 5 year capital investment program that identifies:

1) **the reason for each investment;**

2) **the location, probable type and capacity of the improvement;**

3) **estimated cost; and**

4) **the expected dates of public review and commissioning of the project.**

The fringe areas around the largest urban centres and the major urban parks in Moose Jaw, Saskatoon, and Regina present unique challenges in planning, construction, and operation of the transmission systems. Since facilities in these areas can substantially impact the future of the communities, special planning provisions are required.

The Panel recommends that an effective long-term planning process be established to facilitate coordinated long-term development plans in and around the major urban municipalities and that SaskPower work cooperatively with the major urban park authorities to resolve routing and land management issues in the parks and their environs.

SaskPower, Saskatchewan Highways and Transportation, and the major utilities have a common interest in managing their major corridors.

The Panel recommends that these institutions collaborate in a long-term planning process so that the program of each may be incorporated in the work programs of all utilities in the most favorable fashion.

The tourism industry is marketing Saskatchewan as a pristine natural environment and has an interest in ensuring that this ambience is preserved. Areas of sensitivity include major tourism corridors, unique landscape features, and major tourist destinations such as resort areas and major urban parks.

The Panel recommends that SaskPower establish an ongoing consultative process with Tourism Saskatchewan to keep abreast of developments within the tourism industry with a view to maximizing benefits to both parties.

E.6.3 Public Consultation

SaskPower has long recognized the importance of public involvement in major decisions that affect its business directions. *Community* can be defined as a geographic area with a specific type of social interaction and common ties created by shared interests. In this context, a number of communities can be expected to exist in any extensive linear corridor. The public consultation program should aim to identify these communities and to work collaboratively towards negotiated solutions that meet the interests of all parties.

The Panel recommends that SaskPower adopt a "community-based approach" to social and economic evaluation of transmission line corridors, and direct its efforts at mitigating impacts on the identified communities.

The Panel recommends that SaskPower implement an enhanced public participation process. The process would be aimed at promoting dialogue in an atmosphere of openness and collaboration. It would commence in the project planning phase, beginning with an annual review of the 10 year load forecast and the 5 year capital program. It would include a comprehensive program for public participation during the corridor assessment phase and would result in a negotiated mitigation plan.

Members of local municipal governments could be of exceptional value to SaskPower if they were strategically involved during project planning and evaluation.

The Panel recommends that SaskPower develop processes to more actively utilize the knowledge of the individual members elected to municipal governments and councils as early as possible in the project development cycle while being sensitive to the needs and jurisdiction and interests of the local governments.

To successfully engage members of the communities, adequate time must be provided and public consultation must be scheduled at a time that suits their needs. However, this may not always be convenient for the corporation.

The Panel recommends that SaskPower continue to evaluate the needs of the communities and individual landowners in establishing the time, place, and style of public participation to promote the fullest possible engagement of all stakeholders.

E.6.4 Preparing the Corporation

As a Crown corporation, SaskPower is subject to influence by external stakeholders who exercise their democratic rights to appeal to their elected representatives or to SaskPower executives to pre-empt or modify routing decisions. It is essential that all sectors of the corporation be prepared to discharge the roles and responsibilities in support of transmission project delivery. Elected decision-makers must be kept completely informed as to the progress of consultations, but to the max-

imum possible extent, the decisions should remain within the corporation.

The Panel recommends that SaskPower implement a program to inform SaskPower staff and elected officials about project details and their individual roles and responsibilities in the routing process. The plan must make provision for due process and identify avenues for appeal of routing decisions.

The skills of the persons dealing with the public are vital to the success of transmission project implementation. For instance, it is the view of the Bonneville Power Administration that:

Project managers with good communication skills, a collaborative style and the ability to compromise tend to have the greatest success in completing new transmission line projects. Open public decision-making and public involvement methods today seem to have a major influence on a project's success. (Bonneville Power Administration 2000).

The Panel recommends that SaskPower give a high priority to reinforcing project management skills to ensure the skills and knowledge critical to achieving negotiated, collaborative solutions are current and maintained at a high degree of proficiency among project managers. It is also recommended that careful attention be paid in making key project assignments to ensure that the appropriate skills and knowledge are applied in critical areas.

E.6.5 Corridor Selection and Evaluation

A recommended routing process is illustrated in Figure E.1. The process incorporates many of the activities currently undertaken, expands others, and adds a few. The process includes:

- a project planning phase that consists of the 10 year load forecast, 5 year capital program, a detailed need study and validation, and preparation of capital project authorization;
- a corridor selection phase consisting of biophysical and socio-economic screening, corridor selection, and preparation of the project proposal and public consultation work plan; and
- an assessment phase that includes implementation of the public participation work plan, detailed biophysical characterization, negotiating corridor modifications, and communicating the results to the regulators and stakeholders.

The Panel recommends that SaskPower adopt the revised corridor selection strategy proposed by the Panel to address the issues of public concern.

Much of the public consultation currently takes place before the project proposal is filed; hence, it is conducted outside the provisions of *The Environmental Assessment Act*. This process is in accordance with existing SERM policy guidelines. It has marked disadvantages in that much of the consultation takes place before the detailed project information has been filed with the regulators. This makes it difficult for informed public input. The public has expressed a clear preference that the public consultation phase be undertaken within the framework of *The Environmental Assessment Act* with SERM project officers acting as independent assessors.

The Panel recommends that SaskPower enter into discussions with SERM regarding the approach to administration of the assessment process. The purpose of the discussions is to facilitate project need, description, and the public consultation work plan being filed with SERM as soon as possible after Capital Project Authorization has been received internally within SaskPower.

E.6.6 Landowner Relationship

Relationships with landowners are important to SaskPower. The corporation strives to achieve negotiated solutions in its interaction with landowners.

The Panel recommends that SaskPower continue to enhance the quality of interaction of its representatives with the public, ensuring the continuity of knowledgeable, motivated, well-trained, empowered staff in key contact roles throughout the project delivery cycle.

The Panel also recommends that SaskPower continue to emphasize negotiated solutions as the basis of its interaction with landowners, utilizing alternative dispute resolution techniques as appropriate, reserving expropriation to be used as a last resort such as in the case of emergencies or as a fallback solution for irreconcilable differences.

Corridor routing, diagonal crossing of farmland, and right-of-way acquisition policies continue to be an issue. It is time to update the Compensation Review Board Report (Turner, W.E., Lahey, J., and Oleksyn, D., 1980) and set new directions for right-of-way acquisition.

The Panel recommends that right-of-way acquisition policies be revised to reflect current conditions and that the policies be updated at regular intervals to respond to changing land use practices and economic conditions. The Panel also recommends that an economic analysis of the benefits and costs of diagonal crossing of farmland be undertaken to define the impact of this policy on consumer electrical rates.

The degree of social impact is proportional to the number of landowners being affected and the amount of right-of-way being acquired.

The Panel recommends that SaskPower place increased emphasis on utilizing existing transmission line rights-of-way where this is technically feasible and does not detract from long-term system reliability and that it strive to locate corridors where the fewest landowners will be impacted.

Landowners feel that they are involuntary participants who are inconvenienced for the benefit of the public at large. Further, landowners feel that they are locked into one-time compensation and are perennially impacted, while others, particularly consumers, accrue the benefits. This is an issue that the Panel feels warrants further consideration.

The Panel recommends that SaskPower continue to be responsive to landowner concerns. The impact of capital cost on power rates should be addressed on a project specific basis during the public consultation phase, and an adequate capital cost contingency sum be made available to implement discretionary changes to alleviate valid landowner and other stakeholder concerns due to project implementation.

E.6.7 Technical Issues

The effect of electrical and magnetic fields (EMF) on human health continues to be a substantive issue with some members of the public, but no new information was brought before the Panel.

The Panel recommends that SaskPower continue to monitor EMF research and regularly communicate the results to the public while applying the principal of *"prudent avoidance"* to maximize separation between transmission lines and dwellings or work areas.

The differing standards for clearances and right-of-way widths were noted in the benchmarking study. SaskPower currently uses recommended clearances which differ substantially from the CSA Standard applied in neighbouring Canadian jurisdictions.

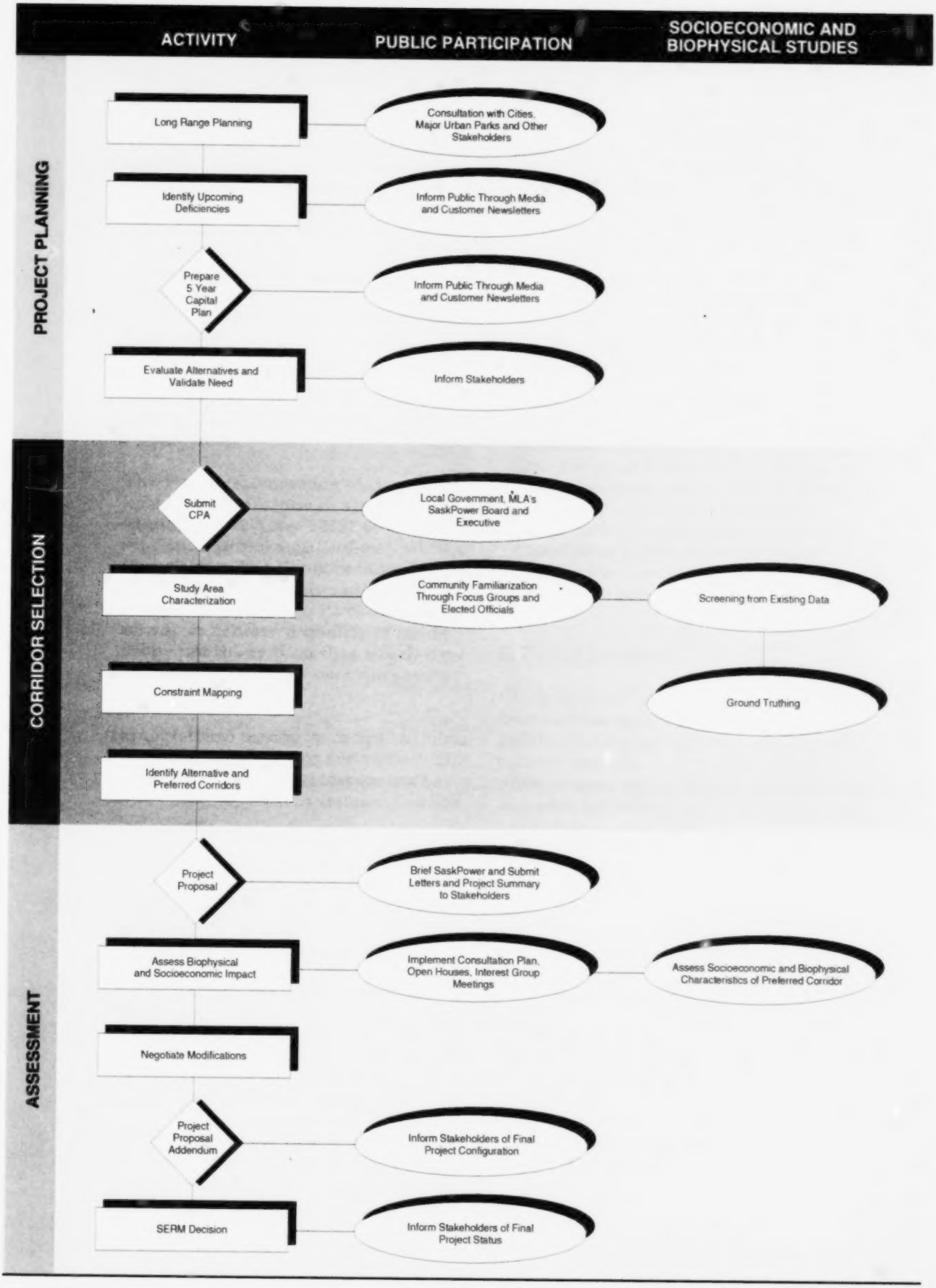
ACTIVITY
PUBLIC PARTICIPATION
SOCIOECONOMIC AND BIOPHYSICAL STUDIES
PROJECT PLANNING
Long Range Planning
Consultation with Cities, Major Urban Parks and Other Stakeholders
Identify Upcoming Deficiencies
Inform Public Through Media and Customer Newsletters
Prepare 5 Year Capital Plan
Inform Public Through Media and Customer Newsletters
Evaluate Alternatives and Validate Need
Inform Stakeholders
CORRIDOR SELECTION
Submit CPA
Local Government, MLA's SaskPower Board and Executive
Study Area Characterization
Community Familiarization Through Focus Groups and Elected Officials
Screening from Existing Data
Ground Truthing
Constraint Mapping
Identify Alternative and Preferred Corridors
ASSESSMENT
Project Proposal
Brief SaskPower and Submit Letters and Project Summary to Stakeholders
Assess Biophysical and Socioeconomic Impact
Implement Consultation Plan, Open Houses, Interest Group Meetings
Assess Socioeconomic and Biophysical Characteristics of Preferred Corridor
Negotiate Modifications
Project Proposal Addendum
Inform Stakeholders of Final Project Configuration
SERM Decision
Inform Stakeholders of Final Project Status

FIGURE E.1 RECOMMENDED PROCESS FOR TRANSMISSION LINE PLANNING

The Panel recommends that SaskPower continue to apply CSA Standard C22-3 No. 1-M87 to define minimum safe clearances for its transmission lines and in defining minimum right-of-way widths. At the same time, continued application of the principal of "*prudent avoidance*" is recommended to achieve a separation of up to 160 m between transmission lines and dwellings or work places in rural settings where this may be practically achieved.

There is a need for a corporate environmental management policy which defines appropriate right-of-way maintenance standards in urban areas.

The Panel recommends that SaskPower continue to apply CSA Standard C22-3 No. 1-M87 to define minimum urban rights-of-way widths (see above). The Panel recommends that SaskPower apply uniform maintenance standards to its urban rights-of-way to achieve a quality of landscape not lower than that which prevails in major linear corridors such as urban freeways.

The uncluttered natural landscape has intrinsic value to both residents and visitors. The aesthetic quality of the landscape can be significantly impacted by transmission line construction.

The Panel recommends that aesthetic impact analysis and mitigation become a routine part of corridor and route selection and design around dwellings, at unique landscape features, in urban corridors, in areas important to tourism, and in the urban parks.

E.6.8 Implementing Projects Currently in Abeyance

SaskPower has transmission projects at various stages of development at different locations in the province and asked the Panel for recommendations on how to proceed with these projects.

The Panel recommends that projects that have not yet received capital project authorization should proceed using the revised process described in this report to the maximum degree possible. For deferred projects that have been approved and for which extensive consultation has already occurred, it is recommended that the project proposal and public consultation work plan be filed as quickly as possible and that the public consultation program be implemented, under the guidance of a third-party facilitator where appropriate, to confirm issues and identify alternatives to resolve these issues. The normal process of negotiating appropriate modifications with stakeholders and completing documentation under *The Environmental Assessment Act* could then proceed.

E.7 Closure

Changing public attitudes with respect to the need and desirability of new transmission facilities has necessitated changes in project delivery methods. A wider range of public concerns must be considered in a fashion that maintains the integrity of the routing process.

The Panel recommends that SaskPower strive for a project delivery model that:

- **is based on a demonstrated need for the transmission project validated by transparent assessment of alternative solutions;**
- **is founded on informed community acceptance rather than community resistance;**
- **is based on an understanding of the community and its perception of the issues;**

- **is implemented by trained staff knowledgeable in collaborative techniques to achieve routes acceptable to stakeholders;**
- **is supported by internal corporate processes and resources, coupled with adequate time to achieve negotiated solutions;**
- **includes continuous community consultation initiated during capital project planning activities;**
- **includes a project assessment phase conducted under the Saskatchewan Environmental Assessment Process in a fashion that emphasizes the independence of the regulators; and**
- **is based on sound engineering and environmental science coupled with enhanced participation at the local level.**

E.8 Expression of Appreciation

The Panel would like to express its appreciation to all members of the public, SaskPower staff, and other organizations and institutions who gave so freely of their time to assist us. We would also like to particularly thank Mr. Greg Vogelsang, P.Eng., P.Geo, who in his capacity as Panel Manager added immense value to our work. The Panel appreciates each effort and contribution and hopes that our collective efforts may contribute to some of the future successes in ensuring a reliable electrical energy transmission system in Saskatchewan.

Section 1 Introduction

1.1 Background

Saskatchewan Power Corporation (SaskPower) is a Crown corporation utility owned by the government of Saskatchewan. SaskPower was established by *The Power Corporation Act* passed on April 8, 1950 (Government of Saskatchewan 1998).

SaskPower's mandate is to provide safe, reliable, and cost-effective electrical energy to its customers. Coupled with this mandate is SaskPower's goal of promoting environmental protection and ensuring effective procedures are in place to involve stakeholders in decision-making processes related to construction of new electrical transmission facilities.

Existing guidelines and practices for route selection for new transmission facilities have been in place for a considerable time. Increasingly, public participation and environmental protection have become important issues in the construction of large-scale industrial-type operations, including electrical transmission lines. Recognizing this change, SaskPower has initiated a process to review and optimize its current guidelines and practices for transmission line routing.

SaskPower wants to ensure that its policies for routing new transmission facilities are sensitive to the concerns of landowners on whose land transmission facilities may be constructed. Transmission systems are defined as that part of the entire system that ties together generating plants to switching stations, switching stations to switching stations, and switching stations to substations. From substations, electricity is routed through the distribution system to consumers.

A three-member panel (the Panel) was appointed by SaskPower to review its current routing guidelines and practices by completing the tasks outlined in the terms of reference.

The Panel member's biographies are included in Appendix A.

1.2 Terms of Reference

The Panel's terms of reference were to complete the following tasks.

1. Complete a review of existing routing policies.

2. Engage other groups in the province to obtain their views.

3. Examine policies used in other similar North American jurisdictions.

4. Formulate recommendations for routing guidelines and practices.

5. Report to SaskPower on all findings.

The Panel operated independently from SaskPower. Extensive consultations were held with various stakeholder groups across the province to solicit advice on routing guidelines. In addition, ample opportunity was provided for public input on an individual basis. Based on the information gathered from consultations and existing literature, the Panel formulated the recommendations discussed later in this report. It is anticipated that these recommendations will be used by SaskPower to develop new or to modify existing guide-

lines for routing transmission facilities.

The scope of the routing review was restricted to activities related to a particular part of the process-beginning with SaskPower's internal approval to proceed with a project and ending with its submission to Saskatchewan Environment and Resource Management (SERM) requesting approval to construct on a particular route.

Geographically, the review focused on the surveyed area of Saskatchewan.

The Panel's terms of reference are provided in Appendix B.

Announcement of the Panel was made by SaskPower in a media release dated June 22, 2000. A copy of the media release is provided in Appendix C.

1.3 Panel Activities

Panel activities focused on two primary themes:

1. Consultations were held with various stakeholder groups in the province to gather views, opinions, and other information related to routing transmission lines in the province. Stakeholder groups contacted included non-profit organizations, municipalities (including rural municipalities), cities, towns, villages, and government departments and agencies. Information was gathered from meetings, written and electronic mail submissions, and telephone conversations. A summary of the Panel's activities is provided in Appendix D. Public input was solicited by means of newspaper advertisements placed in daily and weekly newspapers in Saskatchewan. A copy of the newspaper advertisement is included in Appendix E. In addition, letters from the president of SaskPower to various jurisdictions targeted for benchmarking and to potential stakeholder groups. Copies of the letters are provided in Appendix E. A list of all contacts made during the Panel's work is provided in Appendix F.

2. Benchmarking activities were undertaken to obtain an understanding of transmission line routing procedures in other jurisdictions. Jurisdictions chosen for benchmarking were from parts of Canada and the United States that most closely resembled SaskPower's operations in terms of type of power generation, population, and geographic distribution of transmission facilities. Benchmarking was completed through mailed questionnaire forms, literature searches, and visits to some jurisdictions.

1.4 Acknowledgements

The Panel would like to acknowledge the participation and cooperation of the various groups and individuals who provided input into this process. A wide range of views and opinions were expressed on a variety of topics related to transmission lines without which this project could not have been adequately completed.

The Panel also expresses appreciation to those organizations and individuals who provided input into the benchmarking process. Several people took time from already busy schedules to provide valuable information and material allowing the Panel to provide a meaningful and comparative evaluation of transmission routing methodology and criteria used in other jurisdictions.

In addition, SaskPower Corporation provided valuable information related to existing routing criteria.

Section 2 Electrical Transmission in Saskatchewan

2.1 Defining Transmission Facilities

SaskPower's grid transmission system (or bulk electric system) consists of the interconnected power transmission lines and associated equipment used to transfer electric energy between major points of supply (generating plants) and major points of delivery (switching stations). It also includes the facilities associated with the transfer of electric energy between provinces and with the United States. The grid transmission lines generally operate at voltages above 110,000 volts (110kV) (SaskPower 2000a).

The sub-transmission system consists of power lines and associated equipment used to deliver electricity from switching stations directly to larger customers or to smaller load centers called substations. At the substations, electricity is transformed into lower voltages for delivery to SaskPower's distribution system and ultimately to consumers. Most of SaskPower's sub-transmission system operates at 72 kV (SaskPower 2000a).

SaskPower operates 14 electrical generating plants in the province. Most of the electricity, about 64%, is produced from coal-fired plants. The remainder is produced from hydro-electrical generating plants (20%), purchases (10%), and gas-powered generators (6%) (SaskPower 2000b).

Table 2.1 lists the electrical generating plants in Saskatchewan and the capacity of each.

Table 2.1
Saskatchewan Electrical Generating Plants and Capacities

Plant	Capacity (kW)
Coal	
Poplar River	592,000
Boundary Dam	875,000
Shand	300,000
Hydro	
Coteau Creek	186,000
Nipawin	255,000
E.B. Campbell	288,000
Island Falls	95,000
Athabasca System (3 plants)	23,000
Natural Gas	
Success	30,000
Landis	91,000
Meadow Lake	46,000
Queen Elizabeth	232,000
TOTAL	3,013,000

Source: SaskPower Questions and Answers on Electrical Energy in Saskatchewan. The Condie-Queen Elizabeth 230 kV Transmission Project. (No date).

In order to describe the electrical generation, transmission, and distribution of electricity, it is useful to understand the applicable units of measurement.

The transmission and distribution of electrical energy is measured in *volts*. A volt is a measure of the pressure or push of an electric current; hence, a power line is described in terms of kilovolts (kV), which is the same as 1,000 volts. For example, a 138 kV line has a voltage capacity of 138,000 volts.

The generation of power is measured in *watts*. A watt is the unit used to describe energy

Table 2.2
Summary of Customer Distribution Serviced by SaskPower
As of December 31, 1999

Customer	Number of Customers	% of Total Customers	% of Total kWh
Residential	297,072	69.4	15.0
Farm	68,096	15.9	8.4
Commercial/industrial	61,924	14.5	68.4
Streetlights	930	0.2	0.4
Reseller & Export	5	0.0	7.8
TOTAL	428,027	100.0	100.0

Source: SaskPower 1999 Annual Report

Table 2.3
SaskPower Transmission and Distribution Facilities
As of December 31, 1999

Line Size (kV)	Type	Number of Kilometers of Line
230	Overhead Kilometers	3,684
138	Overhead Kilometers	4,323
115	Overhead Kilometers	400
110	Overhead Kilometers	190
72	Overhead Kilometers	4,382
72	Underground Kilometers	7
25	Overhead Kilometers	22,444
25	Underground Kilometers	648
14.4	Overhead Kilometers	72,459
14.4	Underground Kilometers	42,770

Source: SaskPower 1999 Annual Report

output. Large generators produce electricity in large amounts measured in thousands of watts. The output of commercial generators is therefore typically measured in kW or kilowatts. A MW or megawatt is 1000 kW.

The unit for billing customers is usually measured in kilowatt hours (kWh). A 100 watt light bulb turned on for ten hours will consume 1,000 watts or 1 kilowatt hour.

Electrical generation, transmission, and distribution issues are particularly challenging in Saskatchewan because of the province's widely dispersed population. For every circuit kilometer of transmission and distribution line there are three customers. Other jurisdictions typically have at least four times that number per kilometer of line.

Table 2.2 lists the number of SaskPower customers, based on the number of meters in service on December 31, 1999. Table 2.3 provides a breakdown of the transmission and distribution network including the length of different types of lines. Figure 2.1 shows SaskPower's transmission network in Saskatchewan.

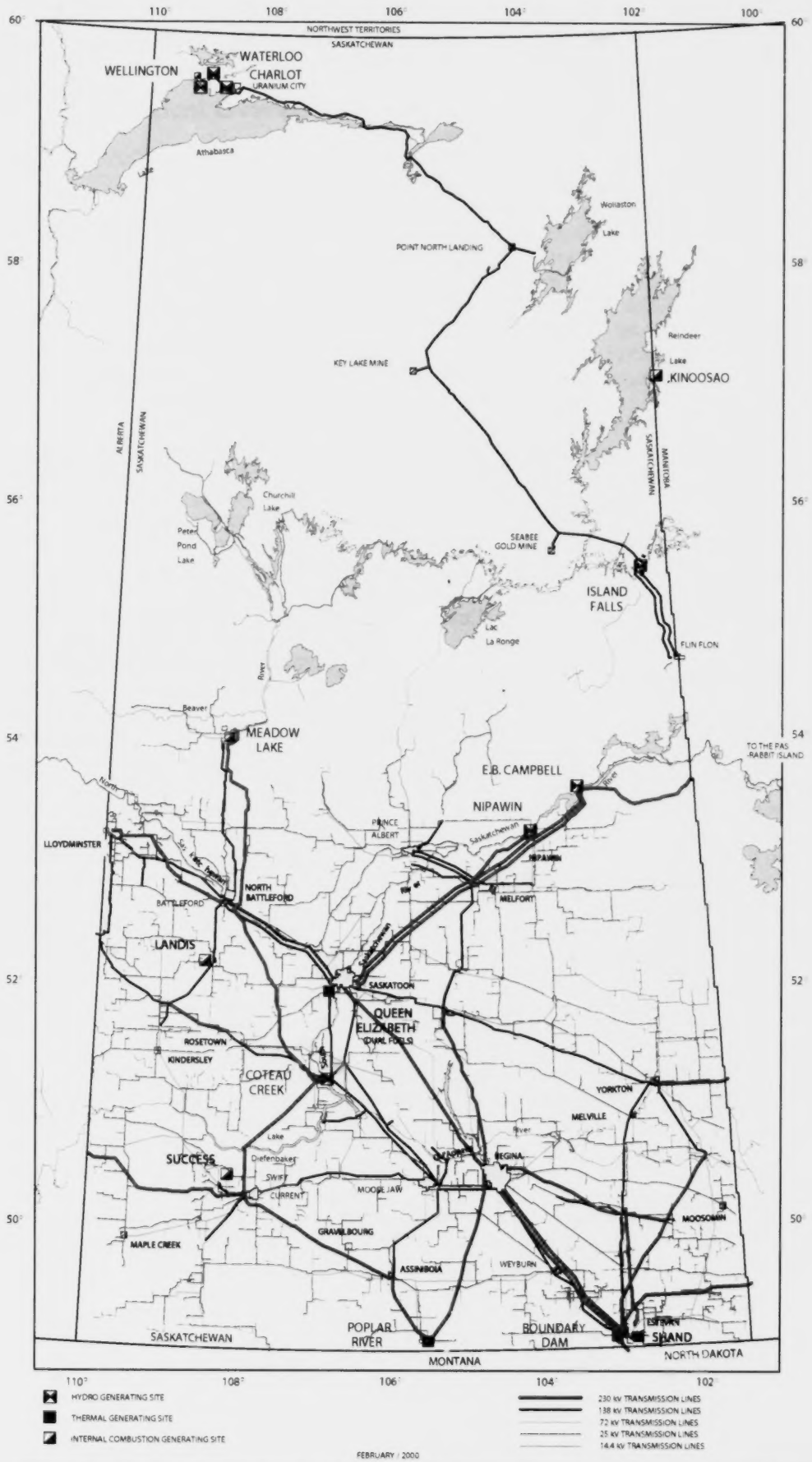

FIGURE 2.1

SASKPOWER'S TRANSMISSION NETWORK

2.2 Historical Overview

2.2.1 1920s - 1950

Saskatchewan is a geographically large province with a diverse terrain containing a variety of physical features. Coupled with the physical nature of the province is the fact that a large portion of Saskatchewan's population resided in remote communities and farms, all of which required electrical service. Following is a historical overview of SaskPower operations (SaskPower 2000c).

During the 1920s, a number of small independently owned electrical generating facilities existed in Saskatchewan. There was considerable variation in prices and usually only those people residing close to a generating facility were able to receive electrical service. With the growing concern expressed by the public over the structure and cost of power, a Royal Commission, led by Chairman L.A. Thornton, was appointed in 1927-28. The Commission's mandate was to address the inequities of electrical supply in Saskatchewan.

The Commission found that 119 small generating facilities were supplying electricity to about 44,000 customers. However, eight facilities were supplying electricity to 32,000 of those customers with the remaining 111 facilities supplying electricity to the remaining 12,000 customers. Pricing varied greatly, operating costs for those facilities serving small, isolated communities were high, and the cost of service was expensive and limited.

The Commission recommended intervention by the government to regulate generation and supply of electricity. The government responded by forming the Saskatchewan Power Commission in 1929. It's mandate was to institute and operate a provincial power system under the form of public ownership while regulating the production and transmission of electricity by private and municipal generating stations.

Two years prior to the formation of the Thornton Commission, and perhaps in anticipation of the need for centralized regulation, the government acquired several privately owned generating facilities. The newly formed Saskatchewan Power Commission subsequently undertook to acquire additional generating facilities. The plants were linked by transmission lines, thereby providing more reliable, widespread, and cheaper electricity to Saskatchewan residents. The remaining independent generating facilities were not allowed to build transmission lines for the purpose of selling electricity to the public and the Commission continued to acquire generating plants where feasible.

Through the 1930s and 1940s the Saskatchewan Power Commission continued to grow. By the end of 1948, the Commission owned 35 generating facilities and more than 8,800 kilometers of transmission lines serving more than 1,500 farm customers. This compares to 200 farm customers in 1945 and perhaps only ten farm customers in 1929.

2.2.2 · 1950 to Present

With the demand for increased service to rural areas, the provincial government converted the Commission to he Saskatchewan Power Corporation in 1949. *The Rural Electrification Act* was passed in 1949 and *The Power Corporation Act* was passed in April 1950. With these two acts of legislation, the Saskatchewan Power Corporation was empowered to expand upon the supply of electricity to rural residents comparable to that provided to urban residents. The innovative use of single supply line helped achieve this task. By 1961, about 58,000 farmers were supplied with electricity utilizing 90,000 km of single line wire, and the supply of electricity to rural residents was essentially completed.

With the ever increasing demand for electricity, expansion of the small existing generating plants was not feasible. Plans were made to construct thermal generating plants, including the existing Boundary Dam Plant at Estevan and the Queen Elizabeth Plant at Saskatoon. Both plants were completed by 1959.

Continued demand prompted the construction of the Poplar River Plant near Coronach in

1975. In 1986, plans for the Shand Plant near Estevan were announced. Shand was completed in 1992.

Parallel with the development of thermal generating plants was the development of hydroelectric power in Saskatchewan. The federal government (through the Prairie Farm Rehabilitation Administration (PFRA)) and SaskPower explored the feasibility of developing a hydroelectric plant on the Coteau Creek in central Saskatchewan. Construction of the Gardiner Dam was completed in 1967. At the time, the Gardiner Dam was the world's largest earth fill dam. The Coteau Creek generating plant is a 298 MW generating facility. Additional hydroelectric facilities were constructed in the northern part of the province to serve increasing demand for electricity in the north. These include the Francois-Finlay plant near Nipawin and the E.B. Campbell Plant on Tobin Lake northeast of Nipawin. In addition, the Island Falls Plant near Sandy Bay, Saskatchewan and three small plants termed the Athabasca System near Uranium City, Saskatchewan had been built by third party companies to service mining operations in Flin Flon, Manitoba and Uranium City, Saskatchewan. The Island Falls plant was built in the early part of the century and the Athabasca system was built in the mid part of the century. Both were subsequently acquired by SaskPower.

In order to meet peak demands, three small natural gas plants operate near Success, Landis, and Meadow Lake, Saskatchewan.

2.3 The Future

SaskPower is currently responsible for the majority of electrical generation and sales in Saskatchewan. Plans are underway to convert to an *open access transmission* (OAT) in the province. This means that other utilities will be given the opportunity to generate and sell electricity to Saskatchewan resellers.

In 1994, SaskPower developed a mission statement to reflect the ongoing changes affecting the corporation. The mission statement says:

> *We provide value-added electrical energy and related services. We achieve this through employee innovation, a competitive spirit and pursuing opportunity for our customers and shareholders.*

SaskPower continues to expand its power supply through the purchase of power from a co-generation unit at Lloydminster operated by Husky Oil Limited and TransAlta Energy Corporation. Additional co-generation power is planned at the Potash Corporation of Saskatchewan's Cory mine. This initiative is a joint venture between SaskPower International and ATCO Power from Alberta. In addition, the Queen Elizabeth Power Station is being repowered and will provide additional capacity.

SaskPower's corporate strategy recognizes that in order to compete economically in the new open market system, they must:

- maintain a reliable and economical supply of electricity;
- meet appropriate environmental protection standards;
- incorporate technological advancements; and
- ensure customer satisfaction.

The implementation of revised transmission facility routing guidelines and practices sensitive to environmental protection, economics, and public acceptance is considered by SaskPower to be a fundamental component to conducting business in a competitive field.

Section 3 Legislative and Regulatory Framework

3.1 Environmental Policy

SaskPower has an environmental policy and a commitment to environmental responsibility; both are outlined in a statement issued by the president and CEO of SaskPower (SaskPower 2000d):

SaskPower is committed to protecting the environment while providing our customers with safe, reliable and cost-effective sources of electricity.

To us, being environmentally responsible means using natural resources while respecting the need to preserve their potential for use by others, now and in the future. It means building and operating our facilities in a manner that will, to the greatest extent possible, conserve natural resources, maintain natural systems and preserve natural diversity. And it means anticipating and, wherever possible, preventing environmental impacts.

The following principles, adopted by SaskPower's Board of Directors and communicated to all employees, confirm our commitment to improved environmental performance and pollution prevention.

- *Commit to comply with environmental legislation and regulations as determined by applicable regulators, and with other corporate commitments.*
- *Identify, monitor and manage all significant environmental aspects associated with our operations and services.*
- *Ensure all employees and contractors recognize their environmental roles and responsibilities.*
- *Identify opportunities for continual improvement in cooperation with employees, contractors, suppliers, regulatory authorities, environmental agencies and our customers. Where opportunities arise, implement cost-effective, energy-efficient technologies and improved management practices throughout our operations and services.*
- *Integrate environmental considerations into capital planning and purchasing decisions.*
- *Implement the fundamentals of waste management: rethink, reduce, reuse, recycle and recover.*
- *Provide the public with an annual review of our environmental performance and environmental management programs.*
- *Audit our environmental performance regularly, including auditing for compliance with the ISO 14001 Standard for Environmental Management.*

In mid-October 2000 SaskPower became the first electrical utility in Canada, and the first major business headquartered in Saskatchewan, to achieve corporate-wide ISO 14001 registration.

ISO 14001 is part of the ISO 14000 series of international environmental management system standards, an initiative developed by the International Organization for Standard-

ization (ISO) and supported by governments and industries in more than 90 countries worldwide. The initiative is improving the way companies around the world do business and, specifically, how they manage their environmental activities.

The ISO initiative provides the basis for environmental management, measurement, evaluation, auditing, and continuous improvement. It is a process whereby an organization implements sound environmental practices in its everyday operational affairs. Maintenance of the ISO registration requires an ongoing commitment to best environmental management practices as well as identification and implementation of practices that lead to continual improvement of the environmental management program.

The Panel considers securing and maintaining the ISO 14000 registration to be a positive and progressive advancement toward achieving SaskPower's goal of environmental protection in relation to its activities.

3.2 Organizational Overview

SaskPower's corporate structure is composed of several 'business units' each of which is headed by a senior SaskPower executive who reports to the president and chief executive officer. The president and CEO reports to and is a member of SaskPower's board of directors. The board of directors is responsible for the stewardship of the corporation. This involves providing leadership in setting SaskPower's long-range strategic direction and approving the corporation's overall strategic plan, operating goals, operating budget, performance indicators, and the business plans established to achieve them. The board is also responsible for overseeing the identification and management of the principal risks of the business, monitoring the performance of senior management, adopting procedures that provide effective communication, ensuring the integrity of internal controls, and developing practices to ensure that the board functions independently of management. Board members must comply with provisions contained in *The Crown Corporations Act* and *The Power Corporation Act*. The board has established a comprehensive set of governance practices and procedures to ensure that its governance responsibilities are met.

The lieutenant governor in council, pursuant to *The Power Corporation Act*, appoints board members. Through the chair, the board reports to the minister in charge of the Crown Investments Corporation.

Although the board is responsible for overseeing the management of the corporation, it is the management of SaskPower who is responsible for the day-to-day operations.

The three groups within SaskPower with primary responsibility in terms of development of transmission facilities are "Transmission and Distribution" "General Counsel" and "Corporate Planning and Regulatory Affairs."

The vice president of Transmission and Distribution is head of the business unit. Reporting to the vice president of Transmission and Distribution are, in sequence, the manager of Materials & Engineering, the supervisor Lines & Stations, and the design engineers.

When the need for a new or upgraded transmission facility is identified and approved internally, the Materials and Engineering-Lines and Stations department assumes the lead role for the project and is supported by other departments as necessary. Supporting departments include network development, environment, land, communications and public affairs and operations and legal counsel. The process of developing new or upgraded transmission facilities is therefore an interactive process internally.

General Counsel is responsible for legal matters that may arise, such as legal challenges to the construction of facilities or expropriation measures. The Land Department is responsible for negotiations with landowners who may or will be affected by a transmission facility.

The Corporate Planning and Regulatory Affairs business unit contains the Environmental Programs department which is

responsible for providing all environmentally related support to a project. Such support includes acquiring appropriate field data, conducting public involvement programs, and working with the engineering team to prepare appropriate environmental management plans, project, and environmental impact statements.

3.3 Legislative Overview

3.3.1 Power Corporation Act

The Power Corporation Act (1950) has undergone numerous amendments, the most recent of which was in 1998 (Government of Saskatchewan 1998).

There are several provisions in the act that are important to the planning and routing of transmission lines:

Section (8) SaskPower has the mandate to provide electricity to the residents of Saskatchewan and cannot delegate this authority to any other organization or individual. This section also provides SaskPower with any other purposes and powers in addition to those listed in Section 8 connected with or incidental to the purposes and power of the corporation as set out in the Power Corporation Act. These provisions give SaskPower the power and authority to construct transmission lines.

Section (23) SaskPower has the authority to acquire and expropriate land for the purposes of constructing, maintaining, and operating power lines, including substations. It is SaskPower's position that expropriation is initiated as a last resort when no compromise with a landowner can be negotiated.

Sections (31-33) SaskPower has the authority to construct or place poles, structures, wires, conduits, or pipes on or under any provincial highway, wherever situated, or on or under any other highway, road allowance, road, street, land or other public place either in or outside of any city, town, village, or hamlet in a rural municipality in Saskatchewan. SaskPower has the authority to enter onto any land on either side of its transmission lines or distribution lines, or the right-of-way acquired for such lines, for the purpose of doing all things necessary for the operation, maintenance, repair and replacement of any line or part of line. Cross arms, wires, or other attachments to power poles may project over the property adjoining a highway, road allowance, road, street, lane, or other public place. Trees and shrubs which are likely to or do interfere with power lines may be trimmed or removed and other obstructions may be removed to such an extent as may be necessary.

Section (38) SaskPower has exclusive rights to supply, transport, distribute, and sell electricity in Saskatchewan.

3.3.2 Environmental Assessment Act

The Environmental Assessment Act (Government of Saskatchewan 1996a) requires proponents to seek and receive the approval of the minister of Saskatchewan Environment and Resource Management (SERM) before proceeding with a *development* as defined in the act.

Typically, proponents whose projects may have environmental impacts submit a *project proposal* to SERM for a determination of whether or not the project qualifies as a development as defined in the act. Although the project proposal stage does not require public participation, SERM may request an assessment of the level of public concern in order to adequately screen the project. The project proposal is screened by an inter-departmental committee (IDC) composed of members of various government departments.

The Environmental Assessment Act contains six criteria that are used to determine whether or not a project fits the definition of a development as defined in *The Environmental Assessment Act*. The six criteria are (Government of Saskatchewan 1996a):

i) have an effect on any unique, rare or endangered feature of the environment;

ii) substantially utilize any provincial

resource and in so doing preempt the use, or potential use, of that resource for any other purpose;

iii) cause the emission of any pollutants or create by-products, residual or waste products which require handling and disposal in a manner that is not regulated by any other Act or regulation;

iv) cause widespread public concern because of potential environmental changes;

v) involve a new technology that is concerned with resource utilization and that may induce significant environmental change; or

vi) have a significant impact on the environment or necessitate a further development which is likely to have a significant impact on the environment.

Upon screening a project proposal, SERM may determine that a project is not a development and therefore no further approval under the act is required. In such a case, the proponent can begin construction of the project, provided construction is carried out as described in the project proposal documentation and the proponent meets any other statutory and regulatory requirements under provincial law.

Where SERM's Environmental Assessment Branch determines that any one or more of the above six criteria applies to a project proposal, then the project is considered a development under *The Environmental Assessment Act* and an environmental impact assessment (EIA) is required.

When an EIA is to be conducted, the act requires that public notice be given. SERM provides project specific guidelines to the proponent which outline the information required in the environmental impact statement (EIS). The proponent then prepares and submits the (EIS). The government inter-departmental committee conducts a technical review of the EIS and, when all issues in the EIS have been adequately addressed, SERM prepares final technical review comments. The EIS and technical review comments are subsequently issued for public review.

Following the public review period, the EIS, technical review comments, and public review comments are submitted to the minister of SERM for a decision. The minister's decision can be to approve the project as presented, approve the project with some conditions, or deny approval of the project. Typically, projects are approved with conditions. When this occurs, the proponent is free to begin development of the project subject to the acquisition of any permits and licenses required by municipalities or government departments.

3.3.3 Guidelines for Environmental Protection from the Development of Electrical Transmission Lines

Assuming that a transmission line or substation has been approved under the provisions of *The Environmental Assessment Act* and that all other permits and approvals have been obtained, SaskPower can commence construction of the facility. SERM has published "Guidelines for Environmental Protection from the Development of Electrical Transmission Lines" (Government of Saskatchewan 1993). The guidelines contain general statements regarding procedures that should occur during the planning and construction phases of the transmission lines in order to promote environmental protection.

It is important to note that the guidelines are not legally binding, but that they are general provisions with which SaskPower is encouraged to comply.

The guidelines present a practical approach to environmental protection of surrounding lands during the development of electrical transmission lines. The purpose of the guidelines is to assist in the mitigation of the impact of transmission line development on the physical, biological, and human environment of Saskatchewan.

The guidelines are intended to cover the general steps in transmission line development

including route selection and survey, scheduling, design and construction, and maintenance and abandonment. SERM states that some flexibility in the application of the guidelines is required because not all guidelines apply to every situation.

The guidelines cover such issues as crossing watercourses and sensitive terrain, minimizing effects on vegetation and wildlife, recognition of potential heritage resources, agricultural related concerns, recreation, tourism, and aesthetic concerns. The guidelines also deal with line construction, scheduling, and maintenance and abandonment.

A copy of the guidelines is attached as Appendix G.

3.3.4 Environmental Management and Protection Act

SERM administers *The Environmental Management and Protection Act* (Government of Saskatchewan 1995). This act gives the minister of SERM specific powers and duties in order to maintain protection of the natural environment in Saskatchewan.

The primary purpose of the act is to allow the minister to impose certain conditions and requirements in order to promote environmental protection. In particular, the act provides the minister with the ability to order any action considered necessary to protect or restore the environment. This can be interpreted to mean that SERM, on behalf of the minister, has the authority to impose any such action considered necessary to protect the environment in relation to transmission line construction.

3.3.5 The Planning and Development Act

Under the provisions of *The Planning and Development Act, 1983* (Government of Saskatchewan 1997) a municipality may enact *development plans* and *zoning bylaws*.

A development plan addresses land use policy issues and serves as a framework to guide a municipality in making development decisions.

Zoning bylaws are laws that control land use and implement the policies contained in development plans. Zoning bylaws may designate certain land uses as permitted or discretionary uses. A permitted use is a form of land use allowed as a right within a particular zoning district. A discretionary use is a form of land use that may be allowed following application to and approval of the council. Zoning bylaws are subject to the approval of the minister of the Department of Municipal Affairs, Culture and Housing.

Municipalities include rural municipalities, northern municipalities and urban municipalities such as villages, town, and cities. Section 2(h) of the act defines a *development* as "...the carrying out of any building, engineering, mining or other operations, in, on or over land or the making of any material change in the use or intensity of the use of any building or land."

Approximately 180 out of 297 rural municipalities in Saskatchewan have enacted zoning bylaws controlling development. Many development plans and zoning bylaws for rural municipalities either exempt public utilities from the provisions of the municipal development plan/zoning bylaw or allow public utilities as a permitted use in all or specified zones of the municipality.

In some circumstances, transmission lines may be considered a development under the act. Where a zoning bylaw exempts public utilities, a development permit is not required. Where a zoning bylaw allows public utilities as a permitted or discretionary use, a permit may be required from the municipality in order to construct the facility.

Where municipalities have not enacted a development plan or zoning bylaw, a proponent of a development is not required to obtain a permit from the municipality.

In summary, zoning bylaws affecting the construction of transmission facilities are variable among provincial municipalities.

3.3.6 The Expropriation Procedure Act

The Expropriation Procedure Act (Government of Saskatchewan 1968) allows provincial departments and Crown Corporations the ability to expropriate land for the purpose of constructing public utility systems such as highways, electrical transmission lines, gas pipelines, or other similar types of facilities.

It should be noted that expropriation of private land is a measure of last resort. Every attempt is made to negotiate agreements with landowners for the acquisition of rights-of-way for public utility systems.

3.3.7 The Canadian Environmental Assessment Act

At the federal level, *The Canadian Environmental Assessment Act* (CEAA) (Government of Canada 1992) may apply to transmission projects in Saskatchewan. Pursuant to CEAA are the comprehensive study list regulations which list specific projects that require a *comprehensive study*. In the act, a comprehensive study is defined as an environmental assessment that requires specific information. A comprehensive study is mandatory for the construction of a transmission line of 345 kV or more that is 75 km or more in length on a new right-of-way anywhere in Canada.

It should be noted that smaller lines are not necessarily exempt from CEAA, but may require a detailed level of environmental assessment depending on potential environmental impacts.

The federal government has entered into an agreement with most provinces and territories for the purpose of harmonizing activities. In the event an environmental impact assessment is required by both Saskatchewan and the federal government, then one of the agencies, typically SERM, would assume the role of coordinator and would ensure that the proponent is required to submit only one environmental impact statement.

There have been cases where either the federal government or the province has required an EIA but the other has not.

Section 16 of CEAA provides the information required for a comprehensive study (Government of Canada 1992). This basically outline the information that must be included as part of the environmental assessment and includes:

> ***16.*** *(1) Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:*
>
> *(a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;*
>
> *(b) the significance of the effects referred to in paragraph (a);*
>
> *(c) comments from the public that are received in accordance with this Act and the regulations;*
>
> *(d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project; and,*
>
> *(e) any other matter relevant to the screening, comprehensive study, mediation or assessment by a review panel, such as the need for the project and alternatives to the project, that the responsible authority or, except in the case of a screening, the Minister after consulting with the responsible authority, may require to be considered*
>
> ***16.*** *(2) In addition to the factors set out in subsection (1), every comprehensive study of a project and every mediation*

or assessment by a review panel shall include a consideration of the following factors:

(a) the purpose of the project;

(b) alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;

(c) the need for, and the requirements of, any follow-up program in respect of the project; and,

(d) the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future.

***16.** (3) The scope of the factors to be taken into consideration pursuant to paragraphs (1)(a), (b) and (d) and (2)(b), (c) and (d) shall be determined*

(a) by the responsible authority; or,

(b) where a new project is referred to a mediator or a review panel, by the Minister, after consulting the responsible authority, when fixing the terms of reference of the mediation or review panel.

The Federal Minister of Environment may also refer the project for a panel review, although this is a rare occurrence and is typically only carried out for large or controversial projects.

Section 4 SaskPower's Current Project Delivery Model

4.1 SaskPower Approval and Construction Process

4.1.1 Evaluation of Need for New Facilities

SaskPower takes several factors into account when considering the need for reinforcements to its grid transmission and sub-transmission system. These factors include:

- **Adequacy** - ensuring that the electric system can supply the aggregate electrical demand while maintaining adequate system voltages and without incurring equipment overloads under normal conditions;
- **Security** (applies primarily to the interconnected grid transmission system) - ensuring that the interconnected transmission system can withstand an unexpected failure of a transmission element without causing uncontrolled load interruptions, equipment damage, or other unacceptable conditions;
- **Reliability** - ensuring that the frequency and duration of power outages to load delivery points is kept to an acceptable level; and
- **Cost Effectiveness** - ensuring that the total annual cost of the transmission system (including capital costs, transmission loss costs and maintenance costs) is minimized.

4.1.2 Internal Approval of New Transmission Facilities

New transmission projects are identified and proposed in the 5 year capital budget. Proposals that are included in the approved budget require preliminary studies and a project evaluation to be completed. The budget provides the basis for long-term resource and strategic planning.

The internal process also requires that, for specific new transmission facilities, a capital project authorization (CPA) document be prepared and approved prior to the commitment of funds. The CPA includes the recommendation for the new facilities and provides project need information and a technical description of the competing options that were studied and assessed. In addition, the CPA provides the functional specification that will form the basis for the more detailed design work.

Any CPA involving expenditures greater than $500,000 requires the approval of the vice president of the Transmission and Distribution (T & D) business unit. Typically, a transmission line CPA would require approval by the vice president of T & D due to the high capital costs involved. Major projects that have not been identified and approved in the budget usually require approval from SaskPower board of directors.

4.1.3 Establishing the Study Area

SaskPower defines a study area as an area of land of specific length and width to allow consideration of several alternative corridors utilizing the end points of the transmission

facility. End points are the locations from which the power is generated or transformed (usually a generating station or switching station) to a switching station or substation in the area receiving the power. From the substation, the power is directed through the distribution system to consumers.

Designating a study area depends on site specific characteristics along the general location of a transmission line. The size of a study area depends on the length of the proposed transmission line and potential constraints between end points. Constraints are features that may impede the construction of the line and include but are not limited to, water bodies, environmentally sensitive areas, unstable land surfaces, uneven terrain, or human settlements. From the point of view of direct engineering costs, it is generally desirable to build in a straight line between two end points. However, there are many other factors aside from direct engineering costs that must be considered in the routing decision. Therefore, construction of a transmission line in a perfectly straight line is usually not possible or desirable when all factors are considered. Establishment of the study area allows constraints to be taken into consideration when selecting routing alternatives between end points.

After a study area has been established, aerial photographs are usually obtained and a photo mosaic compiled to aid in route/corridor selection.

4.2 Constraint Identification

4.2.1 Environmental Constraints

Environmental constraints are identified through a review of existing literature, digital sources (including geographic information systems), and other data from representatives of provincial and federal agencies (SaskPower 2000e).

Following identification, environmental constraints are classified as Type A (high), Type B (medium) and Type C (low).

Type A constraints are those areas having special environmental significance that are avoided when considering route/corridor alternatives. Examples of type A constraints are federal bird sanctuaries, Class 1 Canada Land Inventory (CLI) lands for ungulates and waterfowl, potential ecological reserves, provincial parks, national wildlife areas, heritage resource sites, wildlife management units, game preserves, and certain legislated critical wildlife habitat.

Type B constraints are those areas having environmental importance but which, given appropriate mitigation and construction techniques, could be crossed when considering route/corridor alternatives. Examples of Type B constraints are Class 2 and 3 Canada Land Inventory (CLI) lands for ungulates and waterfowl, community pastures, 500 m buffer zones around provincial and regional parks, 500 m buffer zones around Type A critical wildlife areas, and certain legislated critical wildlife habitat.

Type C constraints are those areas having lower environmental significance. These can be crossed when considering route/corridor alternatives. An example of a Type C constraint is cultivated agricultural land.

4.2.2 Engineering Constraints

Engineering constraints are identified using existing information, ground surveys, aerial photographs, and consultation with engineering experts. Areas identified for avoidance where possible include muskegs, permafrost, unstable slopes, erosion-prone surfaces, and areas requiring long-span construction.

4.2.3 Facility Constraints

Facility constraints are identified through a review of existing information, consultation with facility owners, and on-site verification.

Facility constraints include existing infrastructure of SaskTel, SaskEnergy, Department of Highways, SaskWater, CNR, CPR, and other railway rights-of-way, Transport

Table 4.1
Horizontal Clearances to Buildings

Nominal Line Voltage (kV)	USDA Criteria (m)		CSA Criteria (m)		Right-of-Way[2] (m)	SaskPower Recommended Clearance With Conductor Swing (m)
	Minimum Clearance Without Conductor Swing	Right-of-Way	Minimum Clearance Without Conductor Swing	Minimum Clearance With Conductor Swing[1]		
34.5–69	3.0	22–30	—	—	—	—
72	—	—	1.8	6.1–12.3	15–30	30.5
115	3.3	30	—	—	—	—
138	3.4	30–45	2.2	4.7–15.2	15–40	45.7
161	3.5	30–45	—	—	—	—
230	4.0	40–60	2.8	5.8–13.7	30–40	61.0

[1]Right-of-Way and Minimum Clearances vary depending on line design specifications
[2]SaskPower applies CSA criteria for determining right-of-way widths.

Canada, and oilfield facilities and pipeline companies. SaskPower deals directly with these agencies to determine required horizontal and/or vertical clearances from their facilities used for route/corridor identification.

Facility constraints also include habitable buildings, outbuildings, and farmyards. SaskPower's "Guide to the Location of Electrical Transmission and Distribution Lines in Rural Areas" (SaskPower Standard EG2-1961) (SaskPower 1961) recommends clearances that should be maintained to the constraints mentioned above, where practicable. Table 4.1 provides the recommended clearances currently utilized by SaskPower, CSA clearance standards, and U.S.-based clearances. Figure 4.1 shows the application of the clearances to a typical transmission line facility.

SaskPower developed its recommended clearances internally. In addition, SaskPower recommends that, where practicable, lines of 72 kV and higher should not be routed through farmyards.

SaskPower's right-of-way widths are based on CSA clearance criteria although in rural settings, the SaskPower recommended clearances shown in Table 4.1 are maintained wherever possible. For example, a CSA-based right-of-way for a 230 kV line varies from approximately 30 m to 40 m depending on variations in tower and conductor specifications. Applicable CSA clearance to a habitable building for a 230 kV line can vary from approximately 5.8 m to 13.7 m depending upon the structure design. As can be seen from Table 4.1, SaskPower utilizes clearances of 61.0 m for 230 kV lines; this is significantly higher than the CSA standards. From Table 4.1 it can also be seen that SaskPower recommends clearances well above the CSA criteria for 72 kV and 138 kV lines as well.

It is important to note that although SaskPower maintains clearances well above the CSA standards, there is nothing preventing a landowner or private developer from constructing a building immediately adjacent to the right-of-way. This has occurred in some cases, most notably on the PA8 line in the vicinity of Christopher Lake, where private residences were constructed against an existing SaskPower right-of-way. As a result, upgrading the existing 72 kV line to 138 kV was impossible because SaskPower's recommended clearance guidelines for a 138 kV line would not have been met.

In urban settings, it is not always possible to meet SaskPower recommended clearances. CSA criteria are therefore applied to transmission lines traversing urban areas.

U.S. clearance standards are more stringent than those endorsed by CSA (Table 4.1).

4.3 Corridor Option Identification

The corridor options considered are those which avoid Type A environmental constraint areas and engineering constraint areas and which adhere to recommended clearances where practicable. Factors such as the quantity, characteristics, and location of the Types B and C lands are also considered.

SaskPower also considers other routing criteria, as appropriate to the project, that are noted in SERM's "Guidelines for Environmental Protection from the Development of Electrical Transmission Lines" (Government of Saskatchewan 1993).

Where a precise route is not immediately evident, a corridor is established (typically between 200 m and 1,600 m in width) to allow for routing variations made at the time of survey to accommodate site-specific environmental and landowner concerns.

A number of corridor options are chosen for presentation to the public.

4.4 Public Participation

4.4.1 First Round Open House Meetings (Project Dependent)

Based on the size and scope of a proposed transmission facility and discussions held with SERM, SaskPower makes a decision whether or not to hold open houses to discuss the project. For lines where public reaction is expected to be minimal because of the proposed location of the line or other factors, individual landowner contacts and meetings with municipal governments are sometimes used rather than open house meetings. For lines where public reaction is expected to be more significant, a first round of open house meetings is held to explain details of and need for the project, to present routing options to the public, and to receive public input regarding route alternatives.

After presentation of route alternatives to the public, SaskPower chooses a preferred route or corridor option considering environmental, public reaction, and economic factors.

4.4.2 Second Round Open House Meetings (Project Dependent)

SaskPower holds a second round of open house meetings to notify the public regarding SaskPower's choice for the preferred route or corridor and to receive public reaction regarding the choice.

4.5 Regulatory Submissions (Project Dependent)

SaskPower consults with SERM regarding submission of appropriate documentation in support of the proposed project. Depending on the size and scope of project, the documentation may include one or more of the following:

- environmental protection plan;
- project proposal submission; and
- environmental impact statement.

Typically, most projects require submission of a project proposal to SERM for screening. After screening, SERM makes a decision whether or not an environmental impact assessment is required. This process is discussed in more detail in Section 3.3.2. Although SERM usually encourages proponents to conduct public participation at the project proposal stage, this is not mandatory.

SaskPower often conducts environmental field studies within the preferred corridor as appropriate to the project to aid in the determination of the precise location of the transmission line. These studies may include heritage resource impact assessments, wildlife impact assessments, and rare and endangered flora habitat impact assessments.

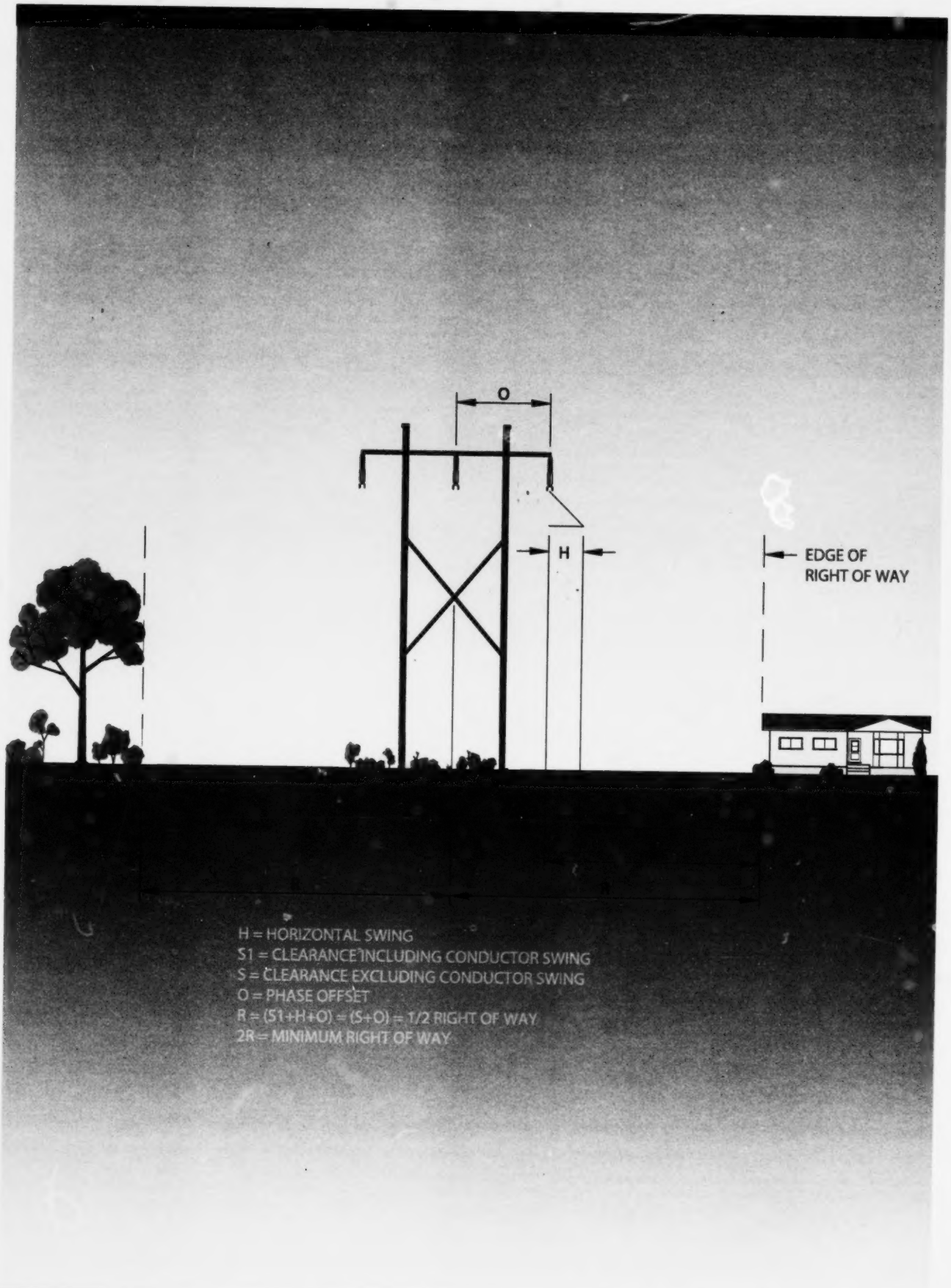
O
H
EDGE OF
RIGHT OF WAY
H = HORIZONTAL SWING
S1 = CLEARANCE INCLUDING CONDUCTOR SWING
S = CLEARANCE EXCLUDING CONDUCTOR SWING
O = PHASE OFFSET
R = (S1+H+O) = (S+O) = 1/2 RIGHT OF WAY
2R = MINIMUM RIGHT OF WAY

FIGURE 4.1

CLEARANCES FOR A TYPICAL TRANSMISSION LINE

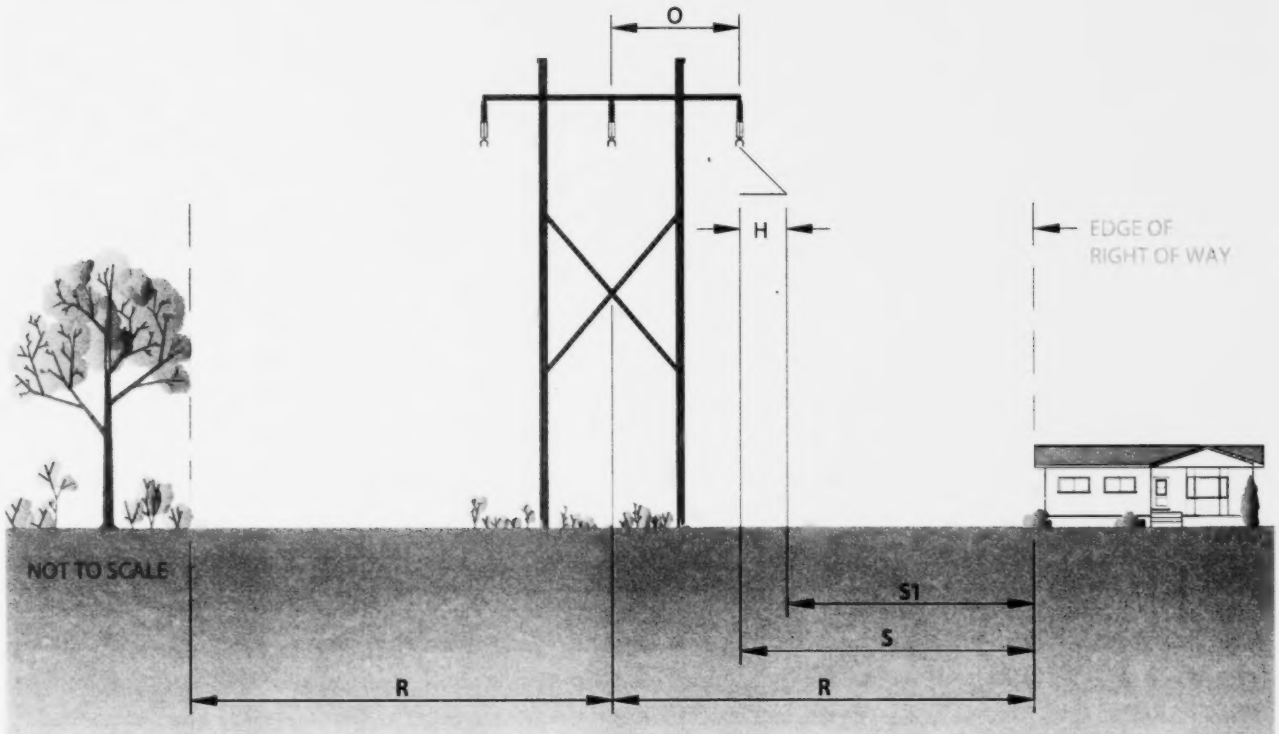

FIGURE 4.1 CLEARANCES FOR A TYPICAL TRANSMISSION LINE

SaskPower and its environmental consultants prepare the necessary environmental reports based on SERM's specific requirements, and await SERM's decision regarding whether or not an environmental impact assessment is required.

After SERM's approval has been obtained for a specific route/corridor, SaskPower submits the route or corridor to other external agencies for approval as required. Examples of external agencies from which approvals may be requested include rural municipalities, Saskatchewan Municipal Government, Saskatchewan Highways and Transportation, Transport Canada, SaskTel, Canadian National Railways, Canadian Pacific Railways, interprovincial pipeline companies, and SERM (environmental permits).

Section 5 Benchmarking

5.1 Purpose

As part of the terms of reference, benchmarking activities were undertaken to identify the processes that other jurisdictions use to plan, construct, and maintain transmission facilities. Attempts were made to benchmark jurisdictions that are similar to Saskatchewan in terms of type of generation, area serviced, and number of customers. The panel felt it would not be beneficial to analyze jurisdictions with large populations within relatively small areas, because the issues and economics of electrical transmission in such areas are likely to be vastly different and not comparable to Saskatchewan.

Jurisdictions in Canada that were benchmarked included Manitoba and Alberta. Benchmarking activities included visits to these jurisdictions to interview representatives of appropriate organizations to gain an understanding of the transmission line regulatory process in each province and to identify internal policies and procedures utilized by the electrical utility companies. In addition to the visits, relevant documentation such as acts, regulations, guidelines, policies, and utility routing criteria was reviewed.

In the United States, North Dakota and Minnesota were benchmarked in detail. Again, activities included visits to these states to interview representatives of appropriate organizations to gain an understanding of the regulatory processes, utility policies, and criteria. Relevant documentation was also reviewed.

Oregon and Colorado were also benchmarked, although these states were not visited. Documentation reviews and telephone interviews with utility representatives were conducted.

5.2 Results

5.2.1 Manitoba

This section describes the process for planning and developing transmission lines in Manitoba and discusses Manitoba Hydro transmission. Benchmarking activities included interviews in person and by phone with representatives of Manitoba Hydro, InterGroup Consultants, and D.S. Lea Ltd., and a review of relevant regulatory and utility documentation.

5.2.1.1 General

Manitoba Hydro is a Crown corporation owned by the government of Manitoba. The utility serves the entire province except the inner portions of the city of Winnipeg which are served by the city-owned Winnipeg Hydro. The two utilities are interconnected and operate as a single integrated system, although Manitoba Hydro is responsible for providing the majority of the province's power requirements.

One of Manitoba Hydro's objectives is to provide Manitoba residents with electricity at the lowest possible cost. Consumer rates are designed to recover the costs of operations, and to provide for an annual allocation to corporate reserves. The reserves are intended to provide rate stability in years of fluctuating river flows, and to provide investor confidence in the financial well being of the corporation.

5.2.1.2 Technical Overview

Manitoba Hydro owns and operates 12 hydroelectric and 2 thermal generating stations in the province. Total generating capability is currently about 5,003 MW. There is potential for the development of another 5,000 MW of hydroelectric power in the northern part of the province. Manitoba services about 402,000 customers within an area of 650,000 km^2.

About 99% of the total power generated by Manitoba Hydro is from self-renewing water energy. The Winnipeg River is located about 100 km from the city of Winnipeg and was the main source of hydroelectric power for Manitoba throughout the first half of the century. By the mid-1950s technological advancements in power transmission made feasible the development of the province's northern rivers for hydroelectric power generation.

Manitoba Hydro's major high-voltage transmission lines operate at 115, 138, 230, and 500 kV. Electricity is fed from transmission lines into voltage transformers where it is fed into the distribution network and further transformed for distribution to cities, towns, and rural communities. The final step is at pole top or underground transformers where the electricity is transformed to 120/240 kV for premises, offices, etc.

Manitoba has several interconnections to Ontario, Saskatchewan, and the United States. These interconnections are mutually beneficial during periods of peak demand or interrupted service. They also allow Manitoba Hydro to sell excess electricity to out-of-province markets.

5.2.1.3 Manitoba Regulatory Process

Environmental issues related to the development of new transmission facilities in Manitoba are regulated under *The Environment Act* (Government of Manitoba 1987). The act requires application for approval to construct and operate certain facilities, including electrical transmission facilities including submission of an environment act proposal form.

Within *The Environment Act* are provisions outlining requirements for different classes of projects. The amount and detail of information required in an application for approval depends on the project classification.

Project Classification

Pursuant to the act is The Classes of Development Regulation (Government of Manitoba 1988a). This regulation categorizes proposed projects into one of three classes (Class I, II, III), depending on the type and scope of project. In regards to electrical transmission facilities, the following classes of developments exist:

Class 1 Developments:

- steam plants: a plant where coal or waste products are burned to produce steam for use in heating or electric power generation.

Class 2 Developments:

- energy production: major operational changes or modifications to existing electric generating stations and electric generating stations equal to or less than 100 MW;
- transmission lines of 115 kV and over but not exceeding 230 kV;
- transformer stations of 115 kV and over but not exceeding 230 kV; and
- conversion or replacement of transmission lines in existing right-of-way if the lines converted or replaced are equal to or exceed 230 kV.

Class 3 Developments:

- electric generating stations greater than 100 MW; and
- electrical transmission lines greater than 230 kV, and associated facilities.

Also pursuant to *The Environment Act* is the

Licensing Procedures Regulation (Government of Manitoba 1988b) which outlines information to be included in an application for approval. Generally, information required in Class I, II and III proposals includes location, landownership and use, proponent, project description, schedules, description of previous related studies and environmental impacts, and proposed environmental management plan. The Licensing Procedures Regulation does not contain requirements regarding public involvement.

For Class I, II, and III developments the proponent must submit a proposal for approval to Manitoba Conservation. Upon review of the proposal, Manitoba Conservation is required to file a summary of the proposal in the central public registry and notify the public through advertisements in the local newspaper or radio that a proposal has been filed.

After application has been made, *The Environment Act* outlines an environmental assessment and licensing process for those developments that may have potential for significant environmental effects. The process encourages early consultation, allows for full public participation, and aims to ensure that economic development occurs in an environmentally responsible manner.

The provincial environmental assessment and licensing process is a five-step process, with three mandatory steps and two steps that are discretionary to the department.

Following is a description of the steps.

Step 1. File a Proposal (Mandatory)

All developments listed in the Classes of Development Regulation require the filing of a proposal. Project proponents are encouraged to consult with Manitoba Conservation staff and the public prior to the proposal being finalized. This consultation will allow potential concerns to be addressed early in the process.

Step 2. Screening (Mandatory)

After the proposal is reviewed, or screened, by the public and a technical advisory committee (TAC) to obtain advice on the need for more information, a full environmental impact assessment (EIA) and, in some cases, a public hearing may be required. The TAC consists of representatives from provincial and federal government departments relevant to the proposal being considered. The public review is conducted through a media advertisement and the placement of the proposed material in public registry files located in government offices and public libraries across the province. At the end of this review and screening step, the proposal can proceed to Step 3 and Step 4 or proceed directly to Step 5.

Step 3. Further Information (Optional)

The screening process (Step 2) can result in a request for further information. The request for additional information can be obtained by direct questions to the proponent, or through information requirements within the guidelines for conducting a full environmental impact assessment. When the additional information is received, it is screened through the public and TAC for review and comment. Requests for additional information can result in delays to a project approval and it is, therefore, beneficial to ensure that the original application is as comprehensive as possible. Early contact with department officials can identify concerns that should be included in the application.

Step 4. Public Hearings (Optional)

The Environment Act allows the minister to call public hearings for a proposal. Although not mandatory, public hearings may be called when a development proposal is of general interest to, or will affect, a large number of Manitoba residents or where, through the screening process, there are significant public concerns identified. An independent panel termed "The Clean Environment Commission" conducts hearings. The commission conducts hearings and provides advice to the minister based on evidence received during the hearing process.

Step 5. Licensing Decision (Mandatory)

At the conclusion of the assessment and

approval process the department makes a decision to either issue a license with limits, terms, and conditions or to refuse a license based on adverse environmental effects.

Public Participation Process

Recognizing the importance of public involvement, Manitoba has formalized Public Participation Guidelines (Government of Manitoba 1997) to assist government officials in achieving effective and timely decisions and results which represent the knowledge, values, and rights of all interested parties.

The guiding principles of the process are:

- a shared process;
- respect;
- commitment;
- timeliness;
- communication;
- responsiveness; and
- accountability

Site Selection and Environmental Assessment Process

Manitoba Hydro has developed a 'Site Selection and Environmental Assessment' (SSEA) (Manitoba Hydro 2000) process which has been applied to numerous transmission and stations projects. The process has evolved to include early and iterative public participation and government consultation. Manitoba Hydro has also developed the mechanism of an internal project SSEA steering committee to respond to the process in a coordinated and timely way.

Generally, there are four phases to Manitoba Hydro's assessment process (Figure 5.1).

1. **Site selection** often involves the initial step of developing a work plan.

The work plan, in addition to describing the SSEA process, identifies the need for a project, study area, and facility size. The work plan is a conceptual document and is subject to review by a provincially appointed technical advisory committee (TAC). A public consultation plan is developed which often includes, during this initial step, meetings with elected officials in municipalities within the study area and possibly other regional organizations. Public involvement, including identification and contact with landowners and other interested parties, also occurs during subsequent steps.

The second step of the site selection phase is characterization of the study area. This includes delineating the approximate boundaries within which it is felt that an acceptable array of siting options can be identified.

The third step is to identify and evaluate, from an environmental perspective, alternative routes. Feasible routing alternatives within the study area are presented. The routes are selected on the basis of several criteria, including existing opportunities for routing, economics, minimizing land use disturbance, minimizing the number of affected landowners, avoidance of environmentally sensitive areas and public input. The routing alternatives are discussed with the TAC and then with the potentially affected public. Manitoba Hydro presents only alternatives that it would be prepared to construct; that is, no option is presented if the corporation is not prepared to build it.

Following this initial TAC and public review, Manitoba Hydro undertakes further comparison of alternatives and identifies a preferred route. This preferred route is reviewed and tested internally. Then it is reviewed with the TAC and, subsequently, with the public once again. This is the final step in the site selection phase.

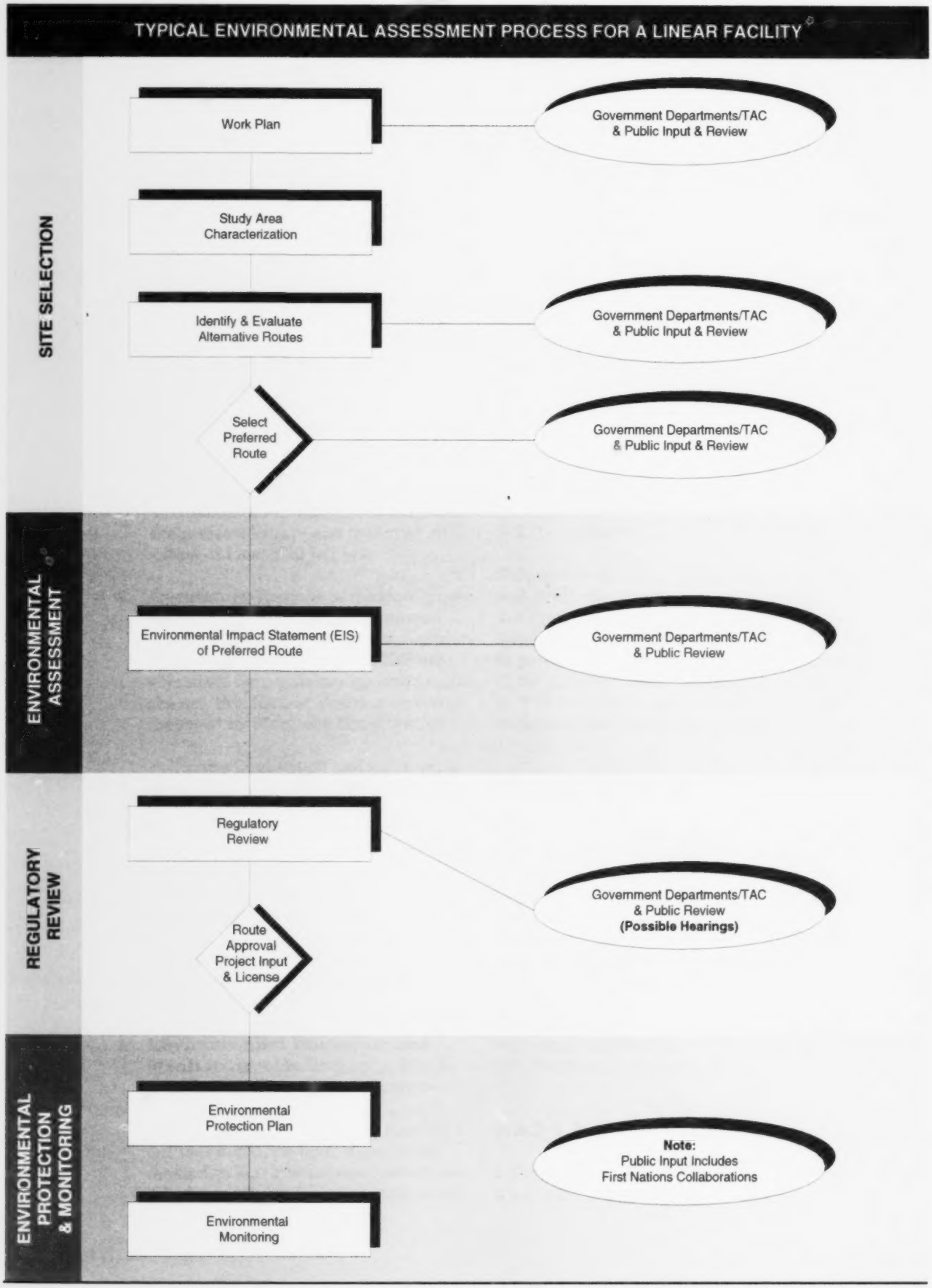
TYPICAL ENVIRONMENTAL ASSESSMENT PROCESS FOR A LINEAR FACILITY
SITE SELECTION
Work Plan
Government Departments/TAC & Public Input & Review
Study Area Characterization
Identify & Evaluate Alternative Routes
Government Departments/TAC & Public Input & Review
Select Preferred Route
Government Departments/TAC & Public Input & Review
ENVIRONMENTAL ASSESSMENT
Environmental Impact Statement (EIS) of Preferred Route
Government Departments/TAC & Public Review
REGULATORY REVIEW
Regulatory Review
Government Departments/TAC & Public Review (Possible Hearings)
Route Approval Project Input & License
ENVIRONMENTAL PROTECTION & MONITORING
Environmental Protection Plan
Environmental Monitoring
Note: Public Input Includes First Nations Collaborations

FIGURE 5.1 MANITOBA HYDRO SITE SELECTION AND ENVIRONMENTAL ASSESSMENT PROCESS

2. **Environmental Assessment** is the second phase in the environmental assessment and licensing process.

   This phase involves completing a detailed environmental assessment of the preferred route and then compiling an environmental impact statement (EIS) for the preferred option. The EIS contains the results of this process, including technical details related to the preferred option, a discussion of alternatives and the reason(s) for selecting the preferred alternative, environmental effects and mitigative measures to minimize effects, and a discussion of public input. It should be noted that the public and TAC have considerable opportunity for input into the EIS, including opportunity to comment on environmental issues associated with the preferred route and potential mitigation of identified impacts.

3. **Regulatory Review** is the third phase in Manitoba Hydro's environmental assessment process. Once *The Environment Act* proposal form and EIS are submitted for regulatory approval under the act, this further phase of review is managed by Manitoba Conservation.

   Following finalization and submission of the EIS, Manitoba Conservation initiates further TAC and public review of the EIS. Considering the ample opportunity for public and TAC input during the various stages leading up to compilation and submission of the EIS, significant deficiencies in the EIS are unusual. Manitoba Conservation renders its decision about the project based on review of the EIS and resolution of outstanding issues.

4. **Environmental Protection and Monitoring** is the final stage of the environmental assessment process.

   An environmental protection plan (EPP) outlines activities that, when implemented, will minimize the environmental effects arising from the construction and ongoing operation of the transmission facilities. Typical environmental protection plan provisions include minimizing disturbance during construction; an EPP provides site specific direction to those constructing the facility to minimize, avoid, or mitigate environmental disturbance.

Upon successful completion of the environmental assessment process, Manitoba Hydro may be issued an approval by the minister of Conservation. *The Environment Act* allows for an appeal process if a member of the public petitions the minister pertaining to a license. After any appeals have been heard and resolved, construction of the facility may commence, subject to the acquisition of municipal permits and approvals.

5.2.2 Alberta

This section describes the process for planning and developing transmission lines in Alberta and discusses transmission facilities in Alberta. Benchmarking activities included interviews in person and by phone with representatives of the Alberta Energy Utilities Board as well as ESBI of Alberta and a review of relevant regulatory and utility documentation.

5.2.2.1 General

The planning and development of transmission lines is generally a common process to all utilities operating in Alberta. The regulatory process is well-established and provides the framework under which all companies operate. Included in the process are information requirements, public consultation format, and permitting requirements. No one specific utility was interviewed during the Alberta benchmarking; rather, the common regulatory process and routing requirements are described in this section.

5.2.2.2 Technical Overview

Following is a description of Alberta's electrical utility system with an emphasis on

Table 5.1
Alberta Existing Generation Capacity

1999/00 Capacity (MW)	Coal	Gas for Steam and Gas Turbine	Hydro	Total
Regulated Utility Generation				
ATCO Electric	1,563	110	1.4	1,674.4
EPCOR	768	841	—	1,609
TransAlta	3,290	—	795	4,085
City of Medicine Hat	—	211	—	211
Total	5,621	1,162	796.4	7,579.4
Non-Regulated Generation				
Industrial				1,033.5
Small power/independent power producers				128
New independent power producers				1,257.4
Total				2,418.9
Interconnections				
British Columbia				800
Saskatchewan				150
Total				950

Source: Government of Alberta Department of Resource Development 2000a.

Table 5.2
Alberta Electrical Customers

	1999 Total Customers	1999 Usage (GWh)	1998 Usage (GWh)	% Change from 1998
Residential	969,733	6,786.2	6,554.8	3.5
Farm	90,075	1,734.2	1,709.2	1.5
Commercial	142,615	12,980.5	12,881.7	0.8
Industrial	33,478	26,500.5	26,497.5	0.0
Total	1,235,901	48,001.4	47,643.2	0.8

1 GWh = 1,000 MWh
Source: Government of Alberta Department of Resources Development 2000a.

transmission lines (Government of Alberta 2000a).

In Alberta, several utility and non-utility generators as well as imports from Saskatchewan and British Columbia provide electricity for the province. Table 5.1 shows the generation capacity and producers in Alberta for 1999-2000.

In addition to the above capacity, approximately 1,608 MW of capacity is under development at 13 sites.

In terms of customers, the industrial sector accounts for over 50% of electrical usage in Alberta. Table 5.2 provides a summary of sector usage and corresponding consumption in 1999.

Four utilities in Alberta, ATCO Electric, EPCOR, TransAlta Utilities, and the City of

Medicine Hat produce more than 95 percent of the power consumed on the public system in the province and own much of the transmission system. Either an investor-owned or a municipally owned distribution system serves each community.

Alberta's province-wide transmission system consists of approximately 20,000 km of high-voltage transmission lines and towers that deliver bulk power from generating stations to 400 substations throughout the province. From the substations electricity is fed to the distribution network. The transmission system is owned and maintained by existing power generating companies but is managed as a single entity. Alberta's distribution network is owned by municipal utilities or rural electrification associations (REAs).

Transmission facilities in Alberta are called *bulk* or *non-bulk*. Bulk defines the movement of bulk power from supplies to load areas, external interconnections, and interconnections of major generation. Bulk transmission facilities typically include interconnections with other jurisdictions, 500 kV lines, 240 kV lines, less than 240 kV lines interconnecting major generators, and radial connected generators. Non-bulk defines the movement of power within the load areas (regional, geographic) with the main objective to supply existing customers. For example, transmission facilities within a city are considered non-bulk.

5.2.2.3 Regulatory System Description

Alberta's electric industry is shifting from regulated monopolies to an open, market-driven system in which the forces of competition are used in an attempt to benefit consumers. The old system was based on each utility operating as a monoply and being regulated by the Alberta and Energy Utilities Board. Each utility had a right and an obligation to serve a particular geographical area. This meant that customers belonged to a certain utility, depending on where they were located. Customers had to deal with this utility for their power service and needs.

The current regulatory system in Alberta evolved from a restructuring process that started in 1996 when *The Electric Utilities Act* (Government of Alberta 1996) came into effect. This act created:

- An independently owned Power Pool through which power is bought and sold in Alberta.
- An organization called the Power Pool Council which governs the Power Pool and is responsible for its fair, open and efficient operation.
- A Transmission Administrator who oversees use of the transmission system by buyers and sellers of power to ensure fair rates and non-discriminatory access for all market participants and the safe, reliable operation of the system.

In 1998 *The Electric Utilities Amendment Act* was proclaimed and was considered the second step in restructuring Alberta's electric industry. The primary purposes of the *Electric Utilities Amendment Act* (Government of Alberta 2000b) are to:

- Complete the orderly transformation of Alberta's electric industry into a competitive, market-driven structure that benefits all residents of the province.
- Bring benefits of competition to customers by providing them with choice over their retail supplier of power, the types of services they receive, and how they participate in the market.
- Complete deregulation of the generation market, creating incentives for efficient capital investment in generation and for efficient operation. This creates a lower-cost industry and competitive rates for consumers.
- Ensure a level playing field for all buyers and sellers of electricity so that customers benefit from open competition.

- Ensure fairness in the changes both to customers who buy electricity and to owners of existing regulated generating facilities. Owners will have a fair opportunity to recover investments made in generating plants. Customers will continue to receive the benefits of low-cost power from existing generating facilities.

Generally, regulation of generation and sales has been lifted. The new electricity structure introduces competition into the province's generation and sales sectors. Long-term contracts are developed which are meant to ensure that many marketers, rather than just four utilities, will sell power to the Power Pool from plants built under regulation. Plants not built under regulation (those built after 1995) can compete directly in an open market. This means that independent power producers and importers can compete on an equal basis with existing utility generators.

Effective January 1, 2001, all customers were able to choose between competing retailers of electricity and related services. They can also choose the types of services they receive and how they participate in the market. While the retail market is developing, residential and farm customers may choose a regulated transitional rate option from their existing supplier for five years, starting January 1, 2001. Small business customers will have this option for three years.

Transmission and distribution networks and pre-1996 power plants remain regulated. Power plants built after 1995 and retail sales have been opened to competition.

Following is a discussion of the key agencies involved in administering the transmission of electrical energy in Alberta.

Power Pool

The Power Pool of Alberta is the market for electricity that is bought and sold in the province. Generators in Alberta and importers outside the province combine energy through the non-profit Power Pool. All distributors and exporters buy energy through the Pool.

The intent of the Power Pool is to ensure an open-access, competitive market for electrical energy. The Pool established an hourly market price for which all power is bought and sold. It coordinates which units will run to generate power in any given hour, based on the selling prices offered by generators. In any particular hour, the lowest price units are used first.

An independent Power Pool Council is responsible for ensuring that the pool is operated as a fair, open, and efficient market for power. Independent individuals with no material interest in the industry have been appointed by the government to serve on the council. The council monitors the performance of the Power Pool and works toward ensuring that the pool remains an open and competitive entity with no one organization gaining a monopoly.

The Power Pool opens the electricity market to competition. Marketers, independent power producers, and importers offer power into the pool at various prices and in various quantities. In addition, retailers, direct access customers, and exporters bid to purchase power from the pool. Under the previous system, power producers (retailers) had to negotiate with the generators to sell power. Under the current system, generators sell power to the pool from where retailers bid on power for resale to consumers. Independent power producers can therefore compete with generators to sell electricity.

In addition to marketing power through the Power Pool, *power purchase agreements* can be purchased. Power purchase agreements (PPAs) are similar to contracts and are made between the owner of a generating facility and the PPA buyer. Buyers of a PPA gain exclusive rights to the generation output of a generating facility and can then sell the electricity in the marketplace, either through direct sales to customers or sales through the Power Pool of Alberta and other marketers. In exchange, the PPA holder is required to

pay the generator the fixed and variable costs of producing electricity as specified in the PPA.

Transmission Administrator

In Alberta, the *Transmission Administrator* plays a key role in creating a competitive market. All electrical energy entering Alberta's system must be bought and sold through the Power Pool. All market participants must have a system access agreement with the Transmission Administrator to access the Power Pool. The Transmission Administrator ensures that access is provided in a fair, open, transparent, and non-discriminatory manner and that the system is reliable.

Open access means that the transmission system is open to all power generators on the same terms, ensuring that owners of the transmission system cannot put competitors at a disadvantage. An open-access transmission system is an integral part of a competitive market for electricity.

Alberta's Transmission Administrator is an independent organization which is appointed through a competitive process. The current Transmission Administrator, as of June 1 1998, is ESBI Alberta Ltd.

The role of the Transmission Administrator is to ensure that all market participants are treated fairly. The Transmission Administrator is responsible for the efficient management and operation of the transmission system. The Transmission Administrator is regulated by the government of Alberta's *Energy Utilities Board*.

Generally, the Transmission Administrator is responsible for total transmission planning in the province. Customers and other stakeholders have the opportunity to provide input to the transmission planning process in a timely, meaningful manner on the following issues (Government of Alberta 2000a):

- proposed modifications of or additions to the transmission system;
- planning for future modifications of or additions to the transmission system; and
- any matter concerning the transmission system or its operation, including tariffs.

Alberta Energy Utilities Board

The Alberta Energy Utilities Board (EUB) is an independent, quasi-judicial agency of the Government of Alberta. The mission of the EUB is to ensure that the discovery, development, and delivery of Alberta's resources take place in a manner that is fair, responsible, and in the public interest. This includes the entire spectrum of resource development related to oil, natural gas, oil sands, coal, hydro and electric energy, pipelines, and electric transmission lines.

The EUB's mandate is to adjudicate issues related to the operation of designated utilities within Alberta and to ensure that the planning, development, and transportation of the province's resources is in the public's best interest.

The EUB administers new applications for energy and utility activities or amendments to existing approvals. The EUB requires companies that want to build a major electric transmission line—usually 60 kV and above—to submit an application and obtain EUB approval before construction may take place. The application process accommodates the interests of landowners and others who may be directly affected by projects, while also taking the broader public interest into account.

The EUB's Utilities Branch is responsible for regulating investor-owned natural gas, electric, and water utilities to ensure that customers receive safe and reliable service. In addition, the branch ensures that power lines are built, operated, and decommissioned in an economic, efficient, and environmentally responsible way (Government of Alberta 2000a).

Alberta Environment and Conservation

Alberta Environment and Conservation (AEC) is the provincial department responsible for ensuring environmental protection is maintained in Alberta. AEC is responsible for reviewing applications for new transmission facilities to determine the level of environmental assessment required. AEC works closely with the Transmission Administrator and the EUB in assessing new projects.

AEC has issued *Environmental Protection Guidelines for Electric Transmission Lines* (Government of Alberta 1995) which provide guidance for maintaining environmental protection for new transmission line projects.

For environmental protection purposes, the guidelines classify transmission lines in the province as Class I or Class II facilities.

Class I facilities require a conservation and reclamation approval prior to any surface disturbance. Class I lines are those lines that have been subject to an EIA (discussed later in this section). Class I lines are subject to the terms and conditions of the approval as well as the guidelines. Class II transmission lines do not require a conservation and reclamation approval but are subject to the guidelines.

5.2.2.4 Implementation Process

Following is a description of the process for the development of new transmission facilities in Alberta. This information was obtained from various government of Alberta documents and from interviews with representatives from the EUB and the Transmission Administrator.

Need Identification

One of the first steps to developing a new transmission line in Alberta is consultation with the Transmission Administrator. This step involves identifying the need, size, and general location of the facility and how it will be beneficial to the province. After these requirements have been accepted, the proponent begins an application process with Alberta Environment and Conservation and the EUB.

Planning and Research

Before submitting a specific project application, the company proposing a power line development must carefully evaluate and identify potential power line routes. The company looks at:

- land ownership,
- land zoning,
- existing development such as towns, cities, and industrial sites,
- agricultural developments of all types,
- wildlife, parks and recreation, and
- archaeological and historical resources.

The early planning at this stage involves only the company. Public involvement usually begins when the company initiates its public consultation program discussed below.

The Environmental Protection Guidelines for Electric Transmission Lines provide guidance on the project planning process.

The guidelines state the following and are summarized below (Government of Alberta 1995):

> *Planning is the key to successful project development, land and soil conservation, and reclamation. Good planning prior to construction will anticipate problems, present or minimize environmental impact, and provide for proper reclamation. Advance planning and discussion with regulatory authorities and landowners will lead to a smooth approval process. A contingency plan must be developed and implemented in accordance with these guidelines.*

Route Selection

Route selection is also guided by the Environmental Protection Guidelines for Electric Transmission Lines. The objective of the route selection process is to *"select a suitable route which will minimize impact on the environment as well as consider socio-economic, engineering and cost factors. Factors such as agriculture, forestry, fisheries, wildlife, recreation, visual resources, residences, water resources, erosion and slump prone areas, must be considered in the route selection process."* (Government of Alberta 1995). The guidelines provide the following steps to minimize impact and optimize compatibility of the transmission facilities with the environment:

- Wherever feasible, use existing linear developments such as road allowances, fence lines, quarter section and section lines, and existing transmission or utility corridors.
- Where possible, retire or upgrade existing lower voltage transmission circuits to allow construction of higher voltage, higher capacity circuits on the existing right-of-way.
- Where feasible, use properly sited and established rights-of-way for the location of additions to existing transmission facilities.
- Locate right-of-way boundaries to avoid creating unusable fragmented areas.
- Minimize conflict with present and planned uses of the land.
- Select rights-of-way that avoid heavily timbered areas, steep slopes, erosion or slump prone areas, shelterbelts, scenic areas, designated critical wildlife areas, natural parks, monuments, historic sites, natural areas, and recreation areas.
- Limit line of sight along the right-of-way in areas of high aesthetic and wildlife value.

Routing criteria include the following schedule and timing considerations:

- Contact appropriate agencies (fish and wildlife officers, grazing pasture administrators) about timing restrictions on the operations.
- Contact landowners regarding their views on the timing of any activities associated with the transmission line.
- Avoid any portion of the year when weather and operating conditions may adversely affect wildlife resources.
- Stop material handling activities when soils are too wet or dry for optimum soil conservation and reclamation.
- Schedule re-vegetation efforts to take advantage of favorable moisture and temperature conditions.

Criteria are provided to determine the end land use for each segment of the alignment prior to commencing surface disturbance and to identify soil conservation, reclamation, and re-vegetation methods to achieve the land use. Normally, the end land use would be the same as before the transmission line was constructed.

End land use criteria for route selection includes beginning early consultation with the landowner and appropriate provincial and municipal agencies to determine the desired end land use.

Public Consultation

As part of preparing a complete application, the company conducts effective public consultation along the route of the proposed project. Following is a description of the public involvement process beginning with the submission of the screening report.

The objectives of Alberta's public involvement process are to identify and resolve environmental and social concerns in the early planning stages of the project. In addition, attempts are made to ensure that all

affected parties understand what is planned and what is happening on the project and are given the opportunity to provide input to conservation and reclamation planning. Key considerations of the public involvement process are to:

- initiate and maintain communication with land managers, landowners, occupants, other affected parties and regional conservation and reclamation inspectors.
- begin communication prior to starting field work;
- discuss with landowners ways of minimizing the effects of the project on their operations (timing, fencing, access, etc.); and
- educate on-site construction personnel about the environmental protection guidelines and environmental concerns for the project.

General Information Requirements

EUB regulations require companies proposing developments to provide comprehensive information to potentially affected parties (e.g., landowners, trappers, cottage owners, and renters) so that they fully understand what is being proposed for land they own or have interest in.

The EUB encourages meaningful discussion between the company and affected parties at this early planning stage as this often helps minimize or avoid potential conflicts. Sometimes, early dialogue enables the company to resolve its issues with the public by making adjustments to the project and thereby avoiding a costly hearing.

A company typically provides the following information:

- the study area and route for the power line project, as well as any alternative routes;
- construction schedules and details;
- the amount of surface area needed for the right-of-way and construction plans for access road(s);
- reclamation plans for the right-of-way;
- safety precautions for nearby residents;
- inspection plans for the completed power line;
- the expected life span of the line;
- what can be done to minimize visual impacts of the line for residents; and
- what impacts residents can expect on land use, agriculture, etc.

Land Compensation and Negotiation

The EUB does not deal with land compensation issues. However, after a hearing and before a transmission line can be built, the company must secure easement, rights-of-way, or agreements from owners or administrators of affected lands. Where affected lands are privately owned, the company obtains the right-of-way by negotiating agreements directly with appropriate landowners. If agreement cannot be reached, the matter must be filed with the Surface Rights Board for final resolution.

Landowners are encouraged to negotiate with the company at an early stage. If the EUB issues a permit approving the project and easements have not been obtained through mutual agreement, the company may acquire right-of-entry through the Surface Rights Board's arbitration process.

Public Notification

Power lines often cover a long distance and thus may affect many people. According to EUB legislation, anyone who may be directly and adversely affected by a proposed transmission line is entitled to receive direct notice of the application and have the opportunity for their concerns to be addressed. To deliver

on this mandate, the EUB usually publishes a Notice for Objection in a local newspaper distributed near the proposed facility and in major Alberta daily newspapers. Copies of the notice are also generally mailed directly to known potentially affected parties. Copies of the company's application are available to the public.

Public Intervention

In response to the Notice for Objection, those with concerns about the proposal should submit their views in writing to the EUB. They then become interveners. Interveners often include landowners, renters, and groups or associations that wish to present a collective point of view, such as municipalities. A written submission (or "intervention") is usually a letter or other written document that clearly outlines the intervening views and concerns about the application and states how the intervener thinks the application should be dealt with. The intervener's views may support or oppose the application and may suggest changes. Submissions must be received at the EUB office by the date and time set out in the Notice for Objection.

Financial Assistance for Interveners

People deemed to be directly affected by a proposed transmission line may be reimbursed for reasonable costs incurred in making an intervention to an EUB public hearing.

Submitting the Application

Public input is one of several factors considered when the company identifies the best route for the transmission line. When a company determines that its application meets all requirements, the company submits it to the EUB for approval to construct and operate the line. During the EUB review, staff may request additional information from the company on issues that the EUB believes need more work. The EUB ultimately decides when the application is complete.

Environmental Screening

In addition to submitting the report to the EUB, it is also submitted to Alberta Environment and Conservation. Alberta Environment and Conservation screens the application to determine whether or not an environmental impact assessment is required. The screening report is made available to the public.

The Environmental Assessment (Mandatory and Exempted Activities) Regulations (Government of Alberta 1993) pursuant to *The Environmental Protection and Enhancement Act* (Government of Alberta 1992) contain provisions regarding when an EIA is mandatory and exempted. An EIA is mandatory for transmission lines with a voltage of 500 kV or greater whereas an EIA is exempted for transmission lines with a voltage of less than 130 kV. Environmental impact assessments for lines between 130 and 500 kV are at the discretion of the director of Alberta Environment and Conservation whose decision is based on line location and potential environmental impacts.

If it is determined that an EIA is not required, Alberta Environment and Conservation works with the EUB to address any deficiencies in the screening proposal. When Alberta Environment and Conservation is satisfied that environmental impacts are mitigated, the next step is for the proponent to obtain approval from the EUB. This approval process is discussed in further detail below.

If it is determined that an EIA is required, the proponent must prepare an environmental impact statement (EIS). To assist in preparing the EIS, the proponent must compile proposed terms of reference. These terms are reviewed by the director of Alberta Environment and Conservation and made available for public review and comment. After a reasonable time has passed for public comment, the director issues final terms of reference which the proponent must use in preparing the EIS. The final terms of reference are made available to the public.

The Environmental Protection and Enhancement Act sets out what information must be

provided in the EIS and generally includes potential positive and negative environmental, social, economic, and cultural impacts of the proposed activity.

Upon submission of the EIS, the director reviews it and may require additional information to be submitted to allow the review to be completed. All procedures such as submission of the report and requests for additional information are done through the EUB. The proponent is required to file the completed report with the EUB and publish it and make it available for public review. The completed report is made available for any hearings deemed necessary by the EUB (discussed below).

After potential environmental impacts have been satisfactorily addressed, the project may be subject to hearings under the authority of the EUB.

More Consultation and Negotiation

After the EUB receives submissions, staff may encourage the applicant and interveners to meet in order to try to resolve any outstanding issues. EUB experience shows that many issues between applicant and intervener can be resolved through early negotiations. Indeed, more "win-win" situations result from early or intermediate negotiations than from the hearing process. Any unresolved matters are usually addressed at a public hearing.

The Public Hearing Process

The EUB's public hearing process provides an opportunity for those involved to express their views directly to a board panel. Concerns often include:

- need for the transmission line or project;
- location of the transmission line or project;
- impacts on residents and the environment;
- impacts on agricultural operations;
- visual impacts;
- cost of proposed facilities;
- technical issues; and
- safety matters.

The EUB schedules the hearing and publishes a Notice of Hearing in newspapers in the local area to notify those who may be interested. Included in the notice is a date for filing interventions, usually two to four weeks after the date of the notice. For people who wish to appear at the hearing, this provides time to comment on the proposal and prepare a written submission. If objections are likely, the EUB will sometimes set a hearing date for a major transmission line application, even though no one has filed an actual intervention.

Anyone with valid concerns about the project may file a written submission and participate in the hearing proceedings. Interveners must be at the hearing in order to present evidence on their position. They may represent themselves or be represented by lawyers and/or other technical experts. Any member of the public may attend a public hearing to observe.

Hearings are usually held in or near the area that will be affected by the proposed project at times and places convenient for those involved. When public hearings are not held locally, interveners may be reimbursed for reasonable travel expenses.

The Decision

After an EUB hearing of an application, the board has three options in reaching a decision: approve the application, approve it with conditions, or deny it. The decision is released within several weeks or months after the close of the hearing, depending on the complexity of the issues. Decisions are issued in the form of a public written report that summarizes the board's findings and includes its

final decision. All hearing participants receive a copy of the report directly from the EUB. The EUB may even decide to issue a news release on the decision. Decision reports are also available from EUB Information Services and on their web site.

5.2.2.5 Construction and Maintenance

Following approval from the EUB, the proponent may begin construction of the transmission facility, subject to acquisition of other permits and licenses. Alberta Environment and Conservation regulates construction and maintenance phases of the project. The Environmental Protection Guidelines for Electric Transmission Lines promote environmental protection during the construction, operations maintenance, and reclamation phases. The guidelines apply to all disturbance associated with the transmission line, including infrastructure (roads, workcamps, etc.).

The guidelines provide guidance on minimizing environmental impacts during construction and maintenance. Following are the key considerations for construction and maintenance:

- Conserve and protect the environment on and adjacent to the right-of-way.
- Plan construction so that the reclaimed right-of-way will conform to, or blend into, the surrounding landscape.
- Inform all personnel, including contractors, that all aspects of their construction activities should be geared to:
  - conservation of natural resources;
  - reclamation of disturbed land;
  - preservation and enhancement of natural beauty; and
  - provision of adequate safety.
- Prior to the start of the project, provide notice of activities and scheduling to each landowner and occupant.
- Consult with landowners to select points of entry to their property.
- Define and mark the working area to confine construction activities.
- Provide reasonable access to landowners across the right-of-way during all phases of project construction to minimize disruption to normal movements of farm equipment and animals.
- Suspend activity if archaeological or historical sites are identified until permission to proceed is granted by the Archaeological Survey of Alberta.
- Select appropriate equipment to minimize environmental impact.
- Clean construction equipment brought in from outside the project area to minimize the risk of introducing new or exotic weeds.
- Confine construction activities to the right-of-way, designated access roads, and ancillary sites. If additional right-of-way is required during construction, obtain written approval from the landowner and approvals from regulatory authorities.
- Plan and control all construction and operation activities to prevent environmental degradation caused by: soil or water contamination; soil erosion, and landscape instability; and blockage of drainage or impoundment of water. Employ appropriate mitigation measures when required.
- Provide protection for undisturbed lands, especially environmentally sensitive areas.

Specific to the above considerations are guidelines on:

- right-of-way clearing and timber salvage;
- aesthetics;

- soil salvage and storage;
- water crossings;
- erosion and stability;
- clean up; and
- reclamation.

Following are the guidelines for these activities.

Right-of-way Clearing and Timber Salvage

Objective: To preserve natural integrity; to minimize visual impacts, soil loss and degradation, and disturbance of adjacent forest cover; and to maximize salvage of merchantable timber.

Considerations:

- When clearing within 30 m of permanent streams or 15 m of intermittent streams, use hand cutting and winching to remove timber.
- Selectively cut vegetation and restrict grubbing in the vicinity of steep erodible slopes, erosion sensitive soils, and other ecologically sensitive areas.
- When determining the time and method of clearing, take into account soil stability, the protection of natural vegetation, and protection of adjacent resources (such as wildlife habitat), and the prevention of siltation of watercourses.
- Use brush rakes on bulldozers to minimize disturbance of ground cover.
- Where rights-of-way cross major highways and rivers, leave a screen of natural vegetation on each side of the road or river. If natural vegetation is such that a screen cannot be left, consider planting native types of plants, low-growing trees, etc. to provide screening.
- When clearing cannot be avoided adjacent to residences or through shelter belts, orchards, or other sensitive areas with high exposure to public view, perform it in a manner which will minimize visual impact.
- Retain a screen of natural vegetation across the right-of-way where line of sight control is required.
- Clear trees and brush as necessary to provide electrical clearance, line integrity, safety to workers and public, or suitable access for construction, operation, and maintenance of the line.
- Clear trees and shrubs according to long-range vegetation management plans.
- Consult the Alberta Timber Management Regulations for specific requirements on public lands.

Aesthetics

Objective: To plan the right-of-way and locate towers to minimize aesthetic impact.

Considerations:

- Locate towers to maximize the screening effect of existing topography and vegetation. For instance, where transmission lines cross major highways and rivers, locate the transmission line towers strategically to minimize visibility and surface disturbance.
- Use alternative tower designs and colors where appropriate.
- At road crossings of two or more circuits, where only a portion of the line is visible from the highway, consider use of multiple circuit towers to minimize the visual impact of the lines at that point.
- Use high strength conductors particularly at scenic roadway, waterway,

ravine, and valley crossings to pick up the line sag and allow for straighter line profiles.

- When lines are adjacent to scenic highways, avoid guyed structures whenever practical.
- Locate borrow areas away from public view.
- Use helicopters for construction on rights-of-way in mountainous or otherwise inaccessible terrain and areas of scenic and historic significance.
- Consider undergrounding for lower voltage sub-transmission lines when alignments parallel or cross scenic and historic sites, recreation areas, wildlife refuges, national and provincial parks, etc.
- In scenic or ecologically sensitive areas, consider tension stringing of conductors to reduce vegetation clearing.

Soil Salvage and Storage

Objective: To ensure that topsoil is adequately salvaged at tower and substation locations. To ensure that topsoil is properly stored for future replacement.

Considerations:

- Selectively salvage and store all topsoil for future replacement.
- Selectively salvage and replace sufficient suitable subsoil to improve reclamation success.
- Avoid overstripping of topsoil.
- Store soil materials a minimum of 2 m from embankments, slumps, cuts, pits, water bodies, and contaminant sources. Protect stored soil materials to prevent loss or degradation.
- Separate spoil materials from stored topsoil and subsoil by at least one meter.

Water Crossings

Objective: To plan and construct watercourse crossings to minimize impacts on water quality, aquatic habitats, and fisheries resources.

Considerations:

- When required, obtain a water resources permit from Water Resources Administration Division of Alberta Environment and Conservation. The permit will contain specific conditions for the water crossing.
- Select appropriate equipment and vehicle crossing methods.
- Obtain permission from the Fish and Wildlife Division prior to installing a crossing structure.
- Develop access as part of clearing operations so that no construction equipment need ford the watercourse, unless use of a ford is approved.
- If extra right-of-way is required, obtain permission from appropriate landowners and regulatory authorities and mark it prior to initiation of watercourse crossing.
- Hand-clear slopes leading to watercourses. Fell trees away from watercourses to reduce damage to aquatic habitat. Immediately remove trees, debris, or soil inadvertently deposited within the high water mark of any watercourse. Do this in a manner that minimizes disturbance of the bed and banks.
- Do not skid or yard trees across a watercourse. Do not push logs into a watercourse.
- Do not place fill material in a watercourse during grading.

- When the vehicle crossing is no longer required, remove crossing structures, restore and stabilize streambeds, banks, and other disturbed areas.

Erosion and Stability

Objective: To leave the project area in a condition that protects soil and surficial materials, both on and off site, against erosion and instability.

Considerations:

- Implement terraces and other erosion control measures where necessary to prevent soil erosion along the right-of-way.
- Locate and design roads to prevent erosion and sedimentation and to serve permanent service access requirements.
- Avoid road construction on unstable slopes. Where feasible use existing service and access roads.
- Improve approach roads and existing low-standard roads that are to be used for future access by providing proper drainage and erosion control.
- As a general rule, do not machine clear (bulldoze) on slopes exceeding 35%.

Compaction

Objective: To minimize soil compaction during construction and operation of the line.

Considerations:

- Stop operations where excessively wet conditions will result in soil compaction.
- Minimize and control vehicle movement on the right-of-way to minimize compaction.
- Following construction, disc the disturbed land on cultivated areas to produce a roughened surface and friable rooting medium. When appropriate, alleviate sub-soil compaction. Substations in particular may require remedial action.

Clean-up

Objective: To clean up the right-of-way in preparation for reclamation.

Considerations:

- Remove rocks, roots, slash, or debris on or within the soil to conform to the adjacent land or the intended land use unless otherwise authorized by the conservation and reclamation inspectors.
- Fell and remove leaning or damaged trees along the edge of the right-of-way.
- Remove all garbage and debris to an approved waste management facility, unless otherwise authorized.
- Clean up woody debris by chipping, burning, removing, or scattering as required. In areas with sensitive or erosion-prone soils, dispose of brush, timber and other woody debris by chipping, shredding, or other suitable means. Use this material as mulch rather than burning it.
- Pile material to be burned in a manner and in such locations as to cause the least fire risk. Take appropriate measures to prevent fire or heat damage to desirable trees and shrubs within and adjacent to the right-of-way, to conform to fire regulations, and to minimize air pollution and smoke hazards.

5.2.2.6 Reclamation

The final step in transmission facility design is reclamation. The objective of reclamation is to return equivalent land capability. This requires proper soil replacement and revegetation, as well as remediation of any soil contamination.

Soil Replacement

Objective: To replace salvaged soil material so that soil depth and quality is equivalent to the original or representative undisturbed land.

Considerations:

- Replace all salvaged soil materials evenly across the right-of-way in the correct sequence.
- Do not replace frozen topsoil until it is thawed.
- When required, alleviate soil compaction to help establish suitable soil conditions and rooting depth.

Revegetation

Objective: To ensure the establishment and growth of species compatible with equivalent land capability and intended land use. The vegetation should be self-sustaining in uncultivated areas or sustainable under normal management in cultivated areas.

Considerations:

- Discuss revegetation methods and species with the landowner or public land manager.
- Where required, use native species, or species mixes that will allow the establishment of native species.
- Scars, as well as cut and fill areas should be fertilized and seeded promptly to stabilize soil, reduce erosion, restore a natural appearance, and provide food and cover for wildlife.
- If required, revegetate and fertilize all forest, pasture, and grazing land but not croplands.
- Reclaim temporary roads by restoring to original contours and revegetating with native ground cover or vegetation acceptable to the conservation and reclamation inspectors.
- If the natural vegetation cannot be effectively saved to provide an adequate screen, plant trees and shrubs native to the area to ultimately provide the necessary screening. Consider establishment of native vegetation of value as food and cover for wildlife.
- Demonstrate uniform establishment and growth of vegetation consistent with the intended land use under normal land management.

Spills and Contaminants

Objective: To ensure that levels of contaminants on the right-of-way or substation area do not become a hazard to human or animal health, do not detrimentally affect water quality, and do not impede germination, growth, survival, or management of the vegetation used for reclamation.

Considerations:

- Take all measures to prevent spills.
- Contain any spills on-site and clean up all spills as soon as possible.

Clearances to Buildings

With regards to clearances to building, utilities in Alberta abide by C.S.A. standard C22.3 No. 1-M87 Overhead systems Canadian Electrical Code Part III Outside wiring (CSA 1997). Some utilities in Alberta have internal recommended clearances which are greater than the CSA criteria.

5.2.3 North Dakota

This section describes the process for planning and developing transmission lines in North Dakota and discusses Basin Electric Power Cooperative and its facilities. Benchmarking activities included interviews in person and by phone with representatives of

Table 5.3
Basin Electric Power Resources

Facility	Location	Capacity (MW)	Type
Laramie River Station	Wheatland, Wyoming	1,650	Coal
Antelope Valley Station	Beulah, North Dakota	900	Coal
Leland Olds Station	Stanton, North Dakota	650	Coal
Western Area Power Administration (Western)	Eight Hydro Dams on the Missouri River	305	Hydro
Spirit Mound Station	Vermillion, South Dakota	104	Oil
Saskatchewan Power Corporation	Seasonal purchases from Saskatchewan	100	Hydro
George Neal Station	Sioux City, Iowa	31	Coal
Total		3,740	

Source: Basin Electric Power Cooperative 1999 Annual Report

Basin Electric, and a review of relevant regulatory and utility documentation.

5.2.3.1 General

Basin Electric Power Cooperative is a consumer-owned regional cooperative which has its headquarters in Bismarck, North Dakota. Basin Electric operates 3,304 MW of electrical generating capacity. The cooperative operates 2,351 MW of this capacity for about 117 member systems in the eight states of Colorado, Iowa, Minnesota, Montana, Nebraska, North Dakota, South Dakota, and Wyoming. It operates the remaining capacity for participants in the Missouri Basin Power Project. Basin Electric maintains about 2,560 kilometers of transmission lines and serves about 1.5 million customers. Table 5.3 lists Basin Electric's power resources.

Basin Electric owns two significant subsidiary companies. The Dakota Gasification Company is a for-profit company that produces natural gas from coal, byproducts of the coal gasification process, and fertilizer. The Dakota Coal Company is a for-profit company that provides financing for and markets all the lignite production from the Freedom Coal Mine in North Dakota. The Dakota Coal Company also has a division called Wyoming Lime Producers.

5.2.3.2 Regulatory Overview

Transmission line construction in North Dakota is regulated by *The Rules and Regulations of the North Dakota Public Service Commission Governing The Siting of Energy Conversion and Transmission Facilities Adopted Pursuant to Chapters 28-32 and 49-22 of the North Dakota Century Code* (now referred to in this section as Rules and Regulations). These Rules and Regulations apply to the planning, location, construction, operation and maintenance of all energy conversion and transmission facilities (Government of North Dakota 1975a).

The Public Service Commission is the state regulatory agency responsible for reviewing applications for new transmission facilities. The commission has the authority to implement formal and informal processes and methods that it deems necessary for review and evaluation of reports and applications submitted to it pursuant to *The North Dakota Energy Conversion and Transmission Facility Siting Act* (Government of North Dakota 1975b) and the Rules and Regulations. The commission also has the authority to initiate the procedures necessary to monitor construction, operation, and maintenance of transmission facilities to ensure their compliance with the Rules and Regulations.

North Dakota's policy is to site transmission facilities in an orderly manner compatible with environmental preservation and the efficient use of resources. Sites are chosen so as to minimize adverse human and environmental impact while ensuring continuing system reliability and integrity and ensuring that energy needs are met and fulfilled in an orderly and timely fashion.

Certificates of compatibility must be obtained from the Public Service Commission for the construction of a transmission line. Applications for a certificate are similar to "project proposals" in Saskatchewan, and must contain descriptions of the project, alternative routes considered, justification for the need, and a description of the preferred route. The Rules and Regulations contain exclusion and avoidance criteria for routing alternatives. These criteria outline areas that should be avoided unless it is clearly shown that there are no reasonable and acceptable alternatives or unless it is clearly shown that the proposed site or route in such an area will have a lesser adverse human and environmental impact and will be compatible with the greatest public benefit and the least private injury.

The implementation of *The North Dakota Energy Conversion and Transmission Facility Siting Act* through the promulgation of the Rules and Regulations requires a public planning process based on a broad spectrum of public involvement which provides the public with the opportunity for input into planning of transmission facilities. The public involvement process includes public hearings throughout the development, application, change, modification, and review of the Rules and Regulations.

In the act transmission facilities are defined as (Government of North Dakota 1975b):

(a) An electric transmission line and associated facilities with a design of 200 kilovolts or more;

(b) An electric transmission line and associated facilities with a design of 69 to 200 kilovolts, if the facility does not follow quarter section lines, section lines, property lines, roads, highways or railroads. For the purpose of this definition:

(1) an electric transmission line and associated facilities with a design of 69 to 200 kilovolts means a facility which is capable of transmitting 69 kilovolts or more without requiring a substantial change in engineering design, and

(2) "follow" means within 100 feet of the line of right-of-way; or

(c) A gas or liquid transmission line as associated facilities designed for or capable of transporting coal, gas, liquid hydrocarbon products, or water from or to an energy conversion facility, whether or not such facility is within this state.

Public Hearing Process

The Rules and Regulations contain provisions for holding public hearings to allow interested people an opportunity to provide input at several stages during the process of establishing a transmission line.

The Public Service Commission holds public hearings prior to adoption of criteria and standards to be used in preparing the inventory of potential sites and corridors and prior to the granting of a route permit. Notice of a general hearing is given at least 45 days prior to the hearing, by publication in newspapers within the county where the hearing is to be held.

There are three different types of hearings that are held depending on what stage of development the transmission facility project is in.

General hearings are held in connection with the adoption of criteria and standards to be used in preparing the inventory of potential sites and corridors, substantial modifications or additions to the Rules and Regulations, a finding that a demonstrable emergency exists, a determination of the commission's jurisdiction over a proposed facility, the revocation or suspension of a certificate

or permit, and the reconsideration or transfer of a certificate.

Inventory hearings are held to discuss the compilation of the inventory of potential sites and corridors for transmission lines. The inventory of sites generally sets out those areas that are available for use as transmission line corridors. Inventory hearings (usually one in each county being affected) will identify the different corridors being considered along with the preferred corridor. The information being presented addresses major constraints such as possible coal mining areas and oil field developments, along with the obvious constraints of cities, towns, lakes, etc. Notice of inventory hearings are given at least 45 days prior to the hearings. In addition, public hearings are held annually for the purpose of updating the inventory.

Application hearings are held to discuss an application for a certificate of site compatibility, a route permit, an emergency certificate, or an emergency route permit, in every county in which a preferred route alternative is located. Hearings are held within 90 days of the receipt of application and notice of the hearings shall be given at least 10 days and not more than 45 days prior to the commencement of hearings.

Advisory Committees

The Public Service Commission appoints advisory committees to assist in carrying out its duties under the act. The following committees are appointed by the Public Service Commission:

Criteria and Standards Development Committee

Prior to development of the Rules and Regulations, the Public Service Commission appointed a committee consisting of public members to assist in the development of standards and criteria to be used by the commission in preparing the inventory of potential transmission facility corridors and to guide the site suitability, evaluation, and selection process.

Evaluation and Selection Committee

A transmission facility corridor evaluation committee is appointed by the commission to review and evaluate specific applications. Membership on this committee consists of members of the public, a member from the Department of Agriculture, and members for municipally owned, privately owned, and cooperatively owned utilities.

Utility Reporting Requirements

Every utility which owns or operates or plans to operate transmission facilities in the state within the next tens years, must develop a ten-year operating plan. The operating plan contains the following information (Government of North Dakota 1975b):

(a) Existing transmission facilities:

- location;
- type and transmission capacity;
- geographical service area;
- projected operating life; and
- projected date of removal from service.

(b) Proposed transmission facilities for the ensuing ten years:

- general location;
- probable type and transmission capacity;
- geographical service area;
- projected operating life;
- projected date of removal from service; and
- total cost.

(c) Regional Coordination:

- a statement describing how the utility's plan or plans coordinate with those of other utilities serving the region;
- a statement of the efforts by the utility to provide a coordinated regional plan to meet energy needs;
- whether the proposed facilities comprise all or part of a single regional plan; and
- if proposed facilities comprise all or part of a regional plan, such plan shall be submitted.

(d) Environmental information:

- a statement describing efforts by the utility to involve environmental protection and land-use planning agencies in its planning process; and
- a statement describing all other efforts by the utility to identify and minimize environmental problems.

(e) Projections:

- a statement of the projected demand for the service rendered by the utility for each of the ensuing ten years;
- a table showing the increase or decrease by volume and percentage for each year relative to the prior years;
- a statement of the underlying assumptions for the projected demand;
- a statement of the manner and extent to which the utility will meet the projected demand; and
- a map indicating the specific geographic location of the utility's service or areas.

In addition to the above requirements, utilities that are planning to construct or operate a transmission facility within five years must provide an annual development plan covering the ten-year period. The contents of the facility development plan are detailed and include scheduled life, environmental impacts, and conformance with the criteria contained in the inventory of potential sites and corridors.

Application for Certificates of Site Compatibility

Prior to the commencement of construction and operation of a transmission facility, a proponent must obtain a certificate of site compatibility from the Public Service Commission. Information required in the application is extensive and for larger facilities, would parallel the information required in an environmental impact statement in Saskatchewan.

Development plans must conform with all applicable local zoning and land use by-laws and rules and regulations of other agencies having jurisdiction within the facility corridor.

Upon reviewing an application, the commission makes a determination whether or not the application conforms with provisions contained in the act and the Rules and Regulations. After reviewing the application, the commission either approves the application with or without modification or denies it (Government of North Dakota 1976a).

Transmission Route Permit

Upon receipt of the certificate of site compatibility, the proponent has two years within which to apply for a permit for construction of a transmission facility within the designated corridor. Generally, the permit application provides information on the route, names of affected landowners and whether or not the plan differs in any way from the information provided in the application for a certificate of site compatibility.

The application for a transmission route permit contains extensive information regarding the preferred route, land uses, crossings of special areas such as rivers, highways, and restricted land use areas, and information regarding location and size and acquisition of easements and rights-of-way.

Based on the results of the technical review and public input, the commission makes a determination regarding acceptability of the application for a route permit. The permit typically contains conditions regarding maintenance of the facility, reporting, requirements of modifications to the facility, and termination conditions (Government of North Dakota 1976b).

Transmission Facility Corridor and Route Criteria

North Dakota utilizes criteria for preparation of the inventory of potential transmission facility corridors and for the corridor and route suitability evaluation and selection process. Following is a description of the criteria that proponents must conform to when planning a transmission facility (Government of North Dakota 1975a):

Exclusion Areas

Specific geographical areas are considered excluded from use as transmission facility corridors. Buffer zones of reasonable width are required to protect these areas. Discretion is used to determine the width of the buffer zone. Following are some of the exclusion areas.

- Designated or registered: national parks; national historic sites and landmarks; national monuments; and national wilderness areas.
- Designated or registered: state parks; state historic sites; state monuments; state historical markers; state archaeological sites; and state nature preserves.
- County parks and recreational areas; municipal parks; and parks owned or administered by other governmental subdivisions.
- Areas critical to the life stages of threatened or endangered animal or plant species.
- Areas where animal or plant species that are unique or rare to the state would be irreversibly damaged.

Avoidance Areas

Specific geographical areas shall not be considered in the routing of a transmission facility unless it is clearly shown that there are no reasonable and acceptable alternatives, or unless it is clearly shown that the proposed site in such an area will have a lesser adverse human and environmental impact and will be compatible with the greatest public benefit and the least private injury. Economic considerations alone shall not justify consideration for these areas. A buffer zone of a reasonable width to protect the integrity of the area shall be included unless a distance is specified in the criteria. Natural screening may be considered in determining the width of the buffer zone. Following are some of the avoidance areas.

- Designated or registered: national historic districts; national wildlife areas; national wild, scenic, or recreational rivers; national wildlife refuges; and national grasslands.
- Designated or registered: state wild, scenic, or recreational rivers; state game refuges; state game management areas; state forests; state forest management lands; and state grasslands.
- Hardwood draws and woodlands.
- Other areas of historical, scenic, recreational, archaeological, or paleontological significance which are not specifically designated as exclusion or avoidance areas.

- Areas where the facility would interfere with military installations, navigational aids, radio, television, and other communication or electronic control facilities.
- Areas which are geologically unstable.
- Within 500 ft (about 150 m) of a farmstead or rural residence or places of business.
- Areas where surface drainage patterns and groundwater flow patterns will be adversely affected.
- Reservoirs and municipal water supplies.
- Water sources for organized rural water districts.
- Irrigated land.

Selection Criteria

A corridor or route shall be designated only when it is demonstrated to the commission by the applicant that any significant adverse effects which will result from the location, construction, and maintenance of the facility will be at an acceptable minimum or that these effects will be managed and maintained at an acceptable minimum.

The commission determines and evaluates the impact of the proposed facility as it relates to:

- agricultural production;
- irrigated land and land which the owner can demonstrate has soil, topography, drainage and an available water supply that cause the land to be economically suitable for irrigation;
- family farms and ranches;
- noise sensitive land uses;
- the visual effect on the adjacent area;
- existing and potential extractive and storage resources;
- hardwood draws, wetlands, and woodlands;
- military installations, navigational aids, radio, television, and other communication or electronic control facilities;
- human health and safety;
- animal health and safety; and
- plant life.

The Commission gives preference to a proposed corridor or route when an applicant demonstrates that it will maximize potential benefits during the construction, operation, and maintenance of a facility by the adoption and use of the policies and practices relative to the following:

- location and design;
- utilization of available labor in the state;
- training of available labor in the state for the general and specialized skills required;
- economies of construction and operation;
- use of citizen coordinating committees;
- a commitment of a portion of the transmitted product for use in the state;
- labor relations;
- the coordination of facilities;
- monitoring of the environmental impact;
- utilization of existing and proposed rights-of-way and corridors; and
- other existing or proposed transmission facilities.

The process for transmission line develop-

ment in North Dakota involves extensive public involvement early and throughout all stages of the project. Although Basin Electric is consumer owned, this does not make it any easier for the utility to plan and construct transmission facilities.

Basin Electric generally schedules, at a minimum, three years for a project. The process requires acquisition of approval to construct the facility followed by the need to acquire the land.

5.2.4 Minnesota

5.2.4.1 General

This section describes the process for planning and developing transmission lines in Minnesota and discusses Minnesota Power Corporation and its facilities. Benchmarking activities included interviews in person and by phone with representatives of Minnesota Power Corporation and a review of relevant regulatory and utility documentation.

5.2.4.2 Regulatory Overview

Assessment, construction, and operation of transmission lines in Minnesota are regulated by the Environmental Quality Board (EQB) under the authority of Minnesota Rules Chapters 4400 (Government of Minnesota 1999) and by the Minnesota Public Utilities Commission (PUC). The PUC is a department within the government of Minnesota that is responsible for regulating planning, construction, and operation of all public utilities in the state. PUC involvement in transmission line projects is restricted to those lines which are 200 kV or greater with 80 kilometers (50 miles) of length in Minnesota and those lines that are 300 kV or greater with 40 kilometers (25 miles) of length located in Minnesota. If the project fits either of these two criteria, the PUC will initiate a draft environmental report.

The EQB is responsible for reviewing projects that have potentially significant environmental effects and coordinates those projects it determines are interdepartmental in nature, ensuring agency compliance with state environmental policy. Membership on the EQB includes senior state government department representatives, a representative from the governor's office who also serves as board chair, and five members of the public selected by the governor.

Minnesota state law requires that transmission lines be located in a manner that is compatible with environmental preservation and the efficient use of resources. The EQB chooses locations that minimize adverse human and environmental impact while ensuring continuing electric power system reliability and integrity and ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion.

5.2.4.3 Implementation

The first step in the development of a transmission line is an application to the PUC for a *certificate of need* (CON), provided the voltage and distance thresholds discussed above are triggered. The information submitted in the application "must be designated by the applicant as its draft environmental report."

Applications for a CON contain extensive information and must include the following:

- summary of need and additional considerations;
- description of the proposed transmission line and alternatives;
- conservation programs;
- consequences of delay;
- environmental information; and
- the alternative of no facility.

After receiving the CON, the proponent applies to the EQB for a permit to construct the line (Route Designation and Construction Permit). In Minnesota, *high voltage lines* are those designed for and capable of

operation at a nominal voltage of 200 kV or more. For any proposed transmission line of 200 kV or larger, a full review process is required under *The Environment Act* which is administered by the EQB. This typically includes an initial application, an environmental impact assessment (EIA), establishment of a route advisory task force, a public adviser, information meetings and public hearings. Any proposed line that is 69 kV or smaller is exempt from the environmental review (and construction permit) process. Lines between 69 kV and 200 kV are potentially subject to environmental review by the local (county) government and require a Discretionary Environmental Assessment Worksheet (EAW). The EAW is about six pages in length and is used to screen whether or not an environmental impact statement (EIS) is required for the project.

The application for a Route Designation and Construction Permit must include extensive information on the proposed transmission line and alternatives, including:

- a description of the engineering and operational design concepts, including a characterization of the electrical environment;
- a description of the potential human and natural environmental effects of each alternative route and mitigation measures; and
- the CON if required.

Routing considerations required by utilities in Minnesota include use of existing rights-of-way, construction costs, system reliability, and potential effects on land-based economies, public safety, human settlement, and all aspects of the natural environment. After the application has been accepted by the EQB, a Route Advisory Task Force may be established. This task force works with the applicant and EQB to develop route options. A public adviser is also designated to work with the public potentially affected by the project.

An environmental impact assessment (EIA) is then completed and must contain:

- summary of the project description;
- summary of the CON decision;
- description of the proposal and alternative routes;
- description of feasible alternative designs;
- analysis of the potential human and natural environmental effects;
- description of mitigative measures;
- discussion of all known governmental permits; and
- an explanation of the EQB's routing process and public participation process.

At least two public information meetings must be held, one after the EQB's acceptance of the application and a second prior to the public hearings. Comments from the first public informational meeting must be included in the EIA.

Public hearings are adjudicated by an administrative law judge. The process involves conducting public hearings in potentially impacted communities. After the administrative law judge has heard all persons and has reviewed all related information, including the utility's application information, input from the Route Advisory Task Force and the EQB's environmental impact assessment, the judge makes recommendations to the EQB regarding the project. Recommendations typically include whether or not the project should proceed and, if so, what the preferred route is.

Upon receiving the recommendations from the administrative law judge, the EQB makes final decisions regarding the line and, at this point, may issue a permit to construct.

The EQB must make a ruling within one year of accepting the application. When the EQB designates a route, it issues a permit

Table 5.4
Minnesota Power Corporation Generating Capacity

Station Name	Location	Type	Capacity (MW)
Laskin Energy Center	Aurora-Hoyt Lakes	Steam	110
Boswell Energy Center	Cohasset	Steam	916.2
Milton R. Young #2	North Dakota	Steam	322.3
Hibbard Steam Station #3 & #4	Duluth	Steam	55
Thomson	St. Louis River	Hydro	72.3
Blanchard	Mississippi River	Hydro	17.6
Fond du Lac	St. Louis River	Hydro	11.2
Winton	Kawishiwi River	Hydro	4
Little Falls	Mississippi River	Hydro	4.6
Knife Falls	St. Louis River	Hydro	1.9
Pillager	Crow Wing River	Hydro	1.8
Sylvan	Crow Wing River	Hydro	1.9
Scanlon	St. Louis River	Hydro	1.4
Prairie River	Prairie River	Hydro	0.9
System Total as of September 1999			1,521.1

Source: Minnesota Power Corporation 1999-2000

for the construction of the line specifying the type, design, routing, right-of-way preparation, and facility construction it deems necessary and with any other appropriate conditions.

5.2.4.4 Minnesota Power

Following is a description of Minnesota Power Corporation an its facilities (Minnesota Power Corporation 1999-2000).

Minnesota Power is a subsidiary of Allete, which is a publicly traded diversified services company that includes electric services, water services, automotive services, and investments. Minnesota Power (MP) provides the electric services in generation, transmission, and distribution. MP is headquartered in Duluth, Minnesota.

Electric operations include Superior Water, Light and Power and serve 143,000 customers in northeastern Minnesota and northwest Wisconsin. Electric operations supply wholesale electric power to 15 municipal systems and through a power marketing division (MPEX) power is sold across the Midwest. About half of MP's power goes to large industrial users. Table 5.4 shows MP's generating capacity.

MP's service area is about 67,350 km^2 serving 144 communities directly and 35 communities indirectly. Total transmission line length is about 3,371.72 km and total distribution line length is about 9,298.5 km.

MP must abide by the regulatory process outlined above when planning a new transmission line facility.

MP typically projects 5 to15 years into the future as part of its planning process. Extensive consultation is done with other utilities in an attempt to optimize services by working together on projects.

When selecting a route, MP uses constraint mapping. Areas of environmental sensitivity or human occupancy are avoided. As much as is practically feasible, MP uses existing rights-of-way for new lines and usually includes pipeline, railroad, highway, and existing transmission line corridors.

When the need for a new line is identified, a study area is chosen and is based on the end

points of the line. Route alternatives are selected and are up to 2,000 m (1.25 miles) wide. Landowners are notified early on in the process and have opportunity to provide input from the time preliminary routes are chosen through the public hearings.

MP utilizes clearances to buildings as provided in the United States Department of Agriculture "Design Manual for High Voltage Transmission Lines" as discussed in Section 4.2.3.

5.2.5 Oregon

5.2.5.1 General

This section discusses the regulatory requirements and processes for transmission line planning and development in Oregon. Information on the Bonneville Power Administration (BPA), a federal utility system located in Oregon is provided. The following information was obtained through written submissions from BPA to the Panel and from document searches for the state of Oregon.

5.2.5.2 Regulatory Process

Transmission line planning and development in the state of Oregon is regulated under state Statute Chapter 469 "Energy Conservation" (1999) (Government of the State of Oregon 1999a).

Under this law the Oregon Energy Facility Siting Council was created. The Council is authorized to conduct a consolidated review of proposed large energy facilities, including transmission lines, to determine if they should be granted a Site Certificate. The Oregon Office of Energy serves as staff to the Council. The Council's consolidated review is designed to include all state and local government permits and other approvals.

The Council uses Oregon Administrative Rules (OAR) for regulating transmission lines. Specifically, OAR Chapter 345 Division 1 (General Provisions), Division 15 (review process), Division 20 (notice of intent), Division 21 (application requirements), Division 22 (standards), Division 23 (need for facility) and Division 24 (specific standards for transmission lines) apply to the regulation of transmission lines in Oregon (Government of Oregon 1996b).

5.2.5.3 Implementation

The Oregon council's review process has two major phases. The first is a *notice of intent* (NOI) review. The second is the review of an *application for a site certificate* (ASC).

The NOI phase begins with an application to the Oregon Office of Energy. The application describes the proposed facility. The NOI serves as a notice to state agencies, local governments, tribes, and the public that someone intends to build an energy facility (including transmission lines). The NOI phase includes one or more public meetings to present information and obtain comments. The NOI phase evaluates alternate transmission line corridors.

As part of the NOI application, the proponent must provide a list of the names and mailing addresses of all landowners, as shown on the latest tax assessment, who reside within or adjacent to the proposed corridor(s). Property adjacent to the proposed site or corridor means property that is:

- within 100 ft (30 m) of the corridor, where the corridor is within an urban growth boundary;
- within 250 ft (76 m) of the corridor, where the corridor is outside an urban growth boundary and not within a farm or forest zone; or
- within 500 ft (152 m) of the corridor, where the corridor is within a farm or forest zone.

At the end of the NOI phase the council will issue a *project order* selecting a single corridor that the applicant must study in the ASC phase of the project. The project order also identifies the state requirements and

local government land use ordinances that apply to the proposed line. The NOI process takes about six months.

After the project order is issued, the proponent prepares an ASC and submits it to the council. The amount of time this takes depends on the complexity of the proposal, how controversial it is, and the kinds of environmental impacts involved. The Office reviews the application for completeness. This review involves affected state agencies, local governments, and tribes and takes 4 to 6 months. In order to be issued a site certificate, the proponent must justify the need for the project.

The requirements for an application for a site certificate are too extensive to list, but are comparable to the information required in an environmental impact statement.

An integral component of the ASC process is selection and justification of the preferred corridors. Generally, the basis for corridor selection is based on limiting disturbance to environmentally and archaeologically sensitive areas, maximizing the use of existing roadways and corridors, and avoiding areas that may require zoning or bylaw changes.

After the ASC is deemed complete, a number of steps prescribed in state law and council rules are followed. State agencies, local governments, and tribes formally review the ASC. A draft proposed order is prepared and issued for public comment. At least one public hearing is held on the draft proposed order. Opponents to the proposed transmission may request a contested case hearing, which can take a number of months. The council deliberates their final decision, which results in a final order and site certificate. Oregon statutes require that the council reach a final decision within one year of the date the ASC is deemed complete.

The Oregon Regulatory System requires roughly two years to complete (NOI Review, 6 months; ASC review for completeness, 4 to 6 months; ASC review and council final order, 12 months).

A public involvement plan is prepared for each project requiring an environmental impact statement. (A communications plan is prepared for a project that doesn't require an EIS but still needs some public involvement to be successful.) The project team develops the plan. The plan identifies the issues that a project will raise, who will be interested and affected (the public), the team's public involvement goals, and strategies that will be used to inform and involve them.

The public involvement plan is amended throughout a project as knowledge is gained and options refined. The plan is backed up with refinement plans such as meeting plans and release plans at key points in the process such as scoping, public review of draft environmental impact statement, and construction.

Typically, realty specialists from the proposing utility's regional office initiate contacts and complete all transactions with landowners. The state of Oregon's Uniform Act contains provisions and regulations that ensure property owners are offered just compensation for their property. This includes appraising each individual piece of right-of-way and sharing appraisal results with landowners.

When negotiations fail, utilities have eminent domain authority, which may be used against all types of land ownership's except lands held in trust by the United States for Indian tribes.

As part of the ASC process, the proponent must clearly outline the need for the project. For transmission lines, alternatives to be considered include:

- implementation of cost-effective conservation, peak load management, and voluntary customer interruption as a substitute for the proposed facility;
- construction and operation of electric generating facilities as a substitute for the proposed facility;
- direct use of natural gas, solar, or geothermal resources at retail loads as a

substitute for use of electricity transmitted by the proposed facility; and,

- adding standard-sized smaller or larger transmission line capacity.

5.2.5.4 Bonneville Power Administration

The Bonneville Power Administration (BPA) is a federal agency, under the U.S. Department of Energy, that markets wholesale electrical power and operates and markets transmission services in the Pacific Northwest. The power comes from 29 federal dams and one non-federal nuclear plant. The dams and the electrical system are known as the Federal Columbia River Power System. BPA's transmission system accounts for about three-quarters of the region's high-voltage grid, and includes major transmission links with other regions. BPA owns and operates 15,000 circuit miles of transmission lines ranging from 115 kV to 500 kV (Bonneville Power Administration 2000).

BPA was founded in 1939. Most of BPA's transmission lines were built between 1940 and 1980.

BPA is a self-funding agency which pays for its costs through power and transmission sales. Both power and transmission are sold at cost, and BPA repays any borrowing from the U.S. Treasury with interest.

BPA's customers include publicly owned and investor-owned utilities, as well as some large industries. BPA also sells or exchanges power with utilities in Canada and the western United States.

Revenues BPA earns help it fulfill public responsibilities that include low-cost and reliable power and investments in energy conservation and renewable resources. BPA also funds the region's efforts to protect and rebuild fish and wildlife populations in the Columbia River Basin.

BPA's Transmission Business Line Department conducts all transmission design, planning, and construction.

As a federal agency, Bonneville Power Administration is exempted from state regulatory authority by the U.S. Constitution. However, BPA has an agreement with the state of Oregon by which BPA has agreed to coordinate with the State Energy Facility Siting Council when it proposes new transmission lines and to meet the same standards as non-federal applicants.

Depending on the state in which a new transmission line is located (there could be more than one), BPA coordinates with the appropriate State Energy Facility Siting staff and assures that the proposed transmission line complies with applicable state environmental, public health, and safety standards. BPA has conducted joint public meetings with state siting staff.

Determination of Study Areas

A project study area should encompass all reasonable routing alternatives. BPA considers it better to initially study a somewhat larger area than considered necessary and later narrow the scope of detailed environmental and engineering studies to selected corridors within the study area. Study area boundaries can be delineated by landscape features like rivers, mountain ranges or city or provincial boundaries. Existing land use such as highways, railroads, and existing transmission lines can also help define study area edges. Generally, BPA is of the opinion that people prefer that transmission lines share corridors with other linear facilities.

BPA uses a geographic information system (GIS) to store and delineate data on the natural and man-made environment. GIS data maps are used to help select transmission line corridors and routes that avoid environmentally sensitive sites like recreation sites, wetland areas and wildlife sanctuaries, as well as high value land use developments such as subdivisions, commercial areas, and irrigated farmlands.

Determination of Corridor Alternatives

Existing transmission lines and linear land use features tend to be natural corridor locations. Boundaries between land uses such as agricultural land and timberland would be a natural corridor location if such a pattern existed. Also, natural landscape features like steep slopes or rivers tend to become natural corridor barriers (a corridor should avoid crossing back and forth across a river, for example). BPA asks for public input in defining the alternatives that are considered. At times public officials, environmental interest groups or landowners will define a corridor that best meets their needs. BPA believes it is advisable to provide a wide range of corridor/route choices at early stages in the analysis. The range of alternatives may be narrowed at a later stage to 2 or 3 corridors for detailed examination. BPA finds that often one corridor will appeal to environmental interests, and a second will appeal to landowners or residential groups. BPA believes that a range of alternatives offering markedly different qualities tends to lead to a more open-minded dialogue with interest groups.

Principles and Criteria for Determining Final Corridor

BPA's criteria for determining the final corridor is largely qualitative. Factors such as capital cost, environmental impacts, public support, electrical reliability and flexibility, and land use conflict avoidance are examined. Each project is different, and different issues may be more determinate. BPA has not built many new transmission lines in the last 20 years. The lines that BPA has built have taken more time than expected and have cost more than was estimated. Public involvement efforts are much greater today than in past years. The corridor that is ultimately selected and built often is a compromise for all involved. It may be longer and more expensive than BPA would desire; it may also not be as free of visual, land use, or environmental impacts as the public would like. It has been said that one can claim success in siting a new transmission line when everyone is equally unhappy with the decisions that are made.

BPA utilizes existing clearance standards as discussed in Section 4.2.3 unless there are good reasons to increase the clearances.

Environmental Considerations/Constraints

Areas that have been set aside for environmental protection are normally avoided. Such areas as designated wilderness areas, wildlife refuges, wetlands, critical habitats for endangered wildlife, national or state parks, and historic or archeological districts are typically avoided. BPA tries to avoid multiple river crossings and avoid populated areas and irrigated farmlands when possible. The constraints will vary depending on the study area. In some instances there is little land use development and natural constraints tend to dominate. In commercial timberlands they try to locate lines along existing access roads and along ridgelines to reduce conflict with timber harvesting practices. This reduces the need for additional access roads, and occasionally the road and line can share common cleared right-of-way. BPA also tries to locate the lines through less favorable growth sites.

Electric and Magnetic Fields (EMF) Considerations

BPA believes that the public is still uneducated on this issue and tries to provide those interested with up-to-date information on this topic that may relieve some of the concern. BPA tries to avoid minimizing statements on this topic and provides whatever facts have been developed on the topic. BPA has stated that they know of no known cause-and-effect relationship between transmission lines and public health effects. The issue has fluctuated back and forth over the past 20 years and while recent reports suggest that there are no adverse effects, there is no irrefutable scientific proof on the issue.

BPA calculates the magnetic fields that would occur on its rights-of-way and reports the

information in their environmental impact statements. BPA defers to others more qualified when it comes to making judgements about the issue.

In Oregon, a special committee has been established to monitor EMF-related issues and reports its findings periodically to the council. The council reports the findings to the State Legislative Assembly.

Today, environmental concerns and increased citizen activism have required new and more sophisticated transmission line siting methods. Governmental approvals and standards for new transmission lines have increased and become more complex. As a federal agency, BPA follows the National Environmental Policy Act, which requires that each new project with potentially significant environmental impacts is carefully evaluated and reported to affected citizens.

In spite of the many changes, BPA feels that they are successful in developing new transmission lines and substations. The lead time from project identification to energization can sometimes take as long as 5 years. BPA believes that project managers with good communication skills, a collaborative style, and the ability to compromise tend to have the greatest success in completing new transmission line projects. Open public decision-making and public involvement methods today seem to have a major influence on a project's success. There is tremendous pressure to rebuild existing lines and utilize existing transmission corridors today. This tends to run counter to reliability goals which would separate extra-high voltage transmission lines and thereby prevent multiple line outages.

5.2.6 Colorado

5.2.6.1 General

This section describes the process regulating the planning and construction of transmission lines in Colorado. Information was obtained through phone interviews with representatives of Tri-State Generation and Transmission Association, and through a review of relevant regulatory and utility documentation.

5.2.6.2 Regulatory Process

In the United States, regulation of electric transmission varies from state to state. In states such as Wyoming, where Tri-State has facilities, much of the land is federally owned, in which case the federal government has jurisdiction. In such cases, the *U.S. National Environmental Policy Act* (NEPA) applies (Government of the United States of America 1969). In Wyoming, for example, the federal government owns large amounts of land and has regulatory authority over projects such as transmission lines assessment and construction. In addition, Tri-State owns interstate facilities and therefore must conform to federal and state requirements. For example, facilities that cross Colorado must meet state regulatory requirements and where that same facility enters Wyoming, it must meet federal requirements.

NEPA contains extensive provisions for the submission of an environmental impact statement for large-scale projects. The definition of a transmission facility is not clearly identified in NEPA and the requirement for an EIS is therefore subjective depending on the capacity and length of the line. As a general rule, however, projects over 69 kV require an environmental impact assessment.

Where the federal government does not have jurisdiction, regulation of transmission lines is assumed by the state. In some cases, the state may transfer the authority to the county. For larger projects that cross several counties, or more than one state, the regulatory process can become complex and extensive due to the involvement of multiple jurisdictions with varying requirements.

NEPA procedures ensure that environmental information is available to the public during all phases of a project and before decisions are made.

5.2.6.3 Implementation

In Colorado, the first step in the process is the acquisition of a state "certificate of purpose and need". This permit is required by the state government and is required to justify the need for the project. As part of the application, extensive information is required on examining the alternatives to the transmission upgrade, such as new generation and modifications to existing facilities. The certificate of purpose and need contains information about the project in general terms, including cost, alternatives, socioeconomics, and schedules.

For most projects, public hearings are held after the environmental impact statement is submitted. The hearings are administered by an administrative law judge. All hearings are open to public participation. Findings from the hearings are recorded and the administrative law judge makes recommendations to the regulatory agency with jurisdiction over the project in question.

Following approval of the EIS, Tri-State is required to obtain permits on the local (county and urban municipality) level. In some states, including Colorado, the state government has delegated authority to the county. Some exceptions to this are New Mexico and Oregon where the state maintains all decision-making power.

After all federal, state, and local permits are obtained, the utility begins negotiations with landowners to obtain a right-of-way. The utility will not, at this stage, look at alternate routes if negotiations fail, but rather will exercise its right of 'eminent domain' and expropriate the right-of-way. However, expropriation is used only as a last resort.

5.2.6.4 Tri-State Generation and Transmission Association

Tri-State Generation and Transmission Association (Tri-State) generates and sells electricity in several midwest states. Tri-State consists of 44 member rural utilities (18 in Colorado, 12 in New Mexico, 8 in Wyoming and 6 in Nebraska), each of which is owned by the consumers it serves. Headquarters and operations are located in Westminster, Colorado, near Denver (Tri-State Power Generation and Transmission Association 2001).

Tri-State owns, wholly or jointly, or has maintenance responsibilities for about 8,500 km of transmission line ranging from 69 to 345 kV. Tri-State's member utilities serve about 500,000 customers over an area of about 650,000 km^2. Tri-State's generation is derived from several coal, oil, and natural gas generating stations located throughout its four-state member service area. Tri-State also purchases power from other utilities and generates a small amount of power from wind and landfill gas. Tri-State's total generating capacity is 1,265 MW.

An initial step in Tri-State's development of transmission lines is load forecasting. The Load Forecasting Group compiles system energy seasonal peak demand requirements supplied by member distribution cooperatives biannually. Tri-State then prepares a 20-year power requirements study for each member utility and for Tri-State according to guidelines established by the Rural Utilities Service (RUS) of the U.S. Department of Agriculture. The studies contain several alternative economic and weather scenarios. Tri-State's Power System Planning Group then assigns the members' system projections from the power requirements study to delivery points.

The primary considerations and constraints that Tri-State utilizes when planning a new transmission facility are the needs of the member utilities, available line capacity, voltage profiles, and power system reliability as determined by load flow and transient analysis, environmental evaluation, permitting requirements, land and right-of-way costs, and the overall economic cost to Tri-State.

Tri-State determines study areas with the assistance of environmental consultants, right-of-way staff, and the engineering department. The project study area is determined by the need for the project and the

electric system alternatives identified to best meet the needs. A large study area is usually created to accommodate the evaluation of a variety of siting options.

After the study area is defined, resource information is collected from resource and land management agencies and state and local governments. Using this information, a list of preliminary routing criteria is established.

Tri-State utilizes constraint identification for the selection of routing alternatives, including selection of the final route. Generally, the *opportunity* for a corridor and what is *termed sensitive area* or *avoidance area* are considered. Rangeland and existing rights-of-way are examples of opportunities, while airports and threatened and endangered species habitat are examples of avoidance areas. Corridors are created by linking together areas of opportunity while minimizing and avoiding the constraints.

Engineering constraints are important considerations in selecting routes. Some of the considerations include total length, new right-of-way requirements, length adjacent to existing right-of-way, length adjacent to existing roadways, length of existing access and new access, residences within 120 m of the corridor center, residences within 120 m and 240 m of the corridor centerline, road crossings, river crossings, and land type (rangeland, wetlands, etc.). Primary NEPA considerations are factors affecting cultural resources, land use, and threatened or endangered habitat.

With regards to EMF concerns, Tri-State uses qualified independent consultants to address expressed concerns. The Public Utilities Commission in Colorado recommends "Prudent Avoidance" measures be considered for all transmission line projects.

Public Involvement

Tri-State engage in public workshops during the permitting process to solicit public comments and concerns during the planning and environmental assessment process. Public involvement is required at the federal level under NEPA and usually at the state and county levels during the process of obtaining the certificate of purpose and need and local (county level) permits.

Tri-State maintains that if the purpose and need for a project is clearly demonstrated, the public is more receptive to a project.

5.3 Benchmarking Comparison

It is beneficial to compare the current practices of SaskPower against practices in the jurisdictions that were benchmarked.

Following is a discussion on some of the important issues associated with transmission line development and how SaskPower's procedures compare with other jurisdictions.

5.3.1 Public Consultation

SaskPower's public consultation begins after a study area and corridors have been identified. Discussions regarding the project plans are initiated with landowners and other stakeholders either by mail or through a phone call. Public consultation then carries through the planning process in the form of open houses. The open house format includes a series of stations, each of which addresses a particular topic such as environmental considerations, engineering aspects, and route selection. Each station has a SaskPower representative knowledgeable on the topic. Open house participants are encouraged to visit the stations and ask questions on the subjects that concern them. This process provides a mechanism whereby landowners, stakeholders, and the public at large can gain information about a proposed project and make their concerns known. It also provides an opportunity for SaskPower to gain valuable information from landowners regarding possible constraints that might otherwise not be identifiable.

Public consultation in Saskatchewan is required by policy only as part of the envi-

ronmental assessment process. Public consultation is not required in a project proposal but is encouraged and in fact has come to be expected in most project proposals submitted to Saskatchewan Environment and Resource Management. SaskPower has developed a public consultation process that includes input into the project proposal submission to SERM.

Section 14 of *The Environmental Assessment Act* (Government of Saskatchewan 1996a) contains provisions allowing SERM to initiate a public inquiry for developments. It is important to note this process is rarely used and has not been used in the past on transmission line projects and in fact can only be used if a proposal is considered a development as defined in the act.

Public consultation processes employed by Manitoba and Alberta are somewhat more extensive than SaskPower's. Public input in these jurisdictions is initiated as part of the corridor alternatives selection process. Additional public consultation is solicited to narrow the alternatives down to the preferred alternative.

In Manitoba, Manitoba Hydro has developed a process of public consultation starting with the preparation of the work plan. A work plan describes the project in a general sense and is usually the starting point of public consultation. Work plans are one of the first steps in the process and present route alternatives based on, in part, public consultation.

In Alberta, public participation is also solicited early in the planning stages and carries through to the final approval stage. Alberta Energy and Utilities Board requirements contain provisions for public hearings.

Public consultation in the United States begins at an early stage in the planning and assessment process. Although the requirements for conducting an environmental impact assessment are variable between states, some have requirements for assessments for lines over 69 kV. Public involvement is a primary component of the EIA process in the United States. The final stages of the approval process in the United States can involve public hearings adjudicated by an administrative law judge assigned by the Federal Energy Regulatory Commission. These hearings provide an opportunity for the public to examine all information related to the line and provide verbal or written submissions. The administrative law judge then makes recommendations to the governing regulatory body.

Generally, SaskPower's public consultation process is more extensive than what is required by provincial law. The other benchmarked jurisdictions have public consultation processes that commence earlier than does SaskPower's and are more extensive in terms of the amount and form of consultation throughout the process.

5.3.2 Project Development Schedule

Jurisdictions in the United States schedule anywhere from 2 to 5 years for a project to be planned, approved, and constructed. Under federal and state requirements, utilities are required to present long-term generation and transmission plans. In a deregulated environment such as is evolving in the United States, this information is required by the regulatory agencies in order to coordinate and ensure a reliable electrical supply. It can therefore be assumed that load forecasting and planning for a particular project may have started several years prior to the commencement of applying for a certificate of need, as in the case of North Dakota, where 10 year transmission plans are required to be filed annually with regulators.

United States utilities typically allow 2 to 5 years for the permitting and construction stages. Certainly the time requirements depend on the size of the project, complexity of regulatory requirements and opposition, but the experience has been that projects generally take longer and cost more than was planned.

In Alberta and Manitoba, the formal planning process appears to be less demanding.

These jurisdictions allow about 1 to 2 years for environmental assessment and approval phase of smaller projects, but a more extended time frame is needed for larger projects.

SaskPower appears to allow less time than adjoining jurisdictions for permitting and construction. As an example, letters of notice were submitted to landowners potentially affected by the PA8 line north of Prince Albert in July 1999. SaskPower intended to commence construction in January of 2000, thereby allowing about six months for assessment and permitting.

5.3.3 Regulatory Framework

There are distinct and significant differences between the regulatory framework in which SaskPower and Manitoba Hydro operate compared with other benchmarked jurisdictions. SaskPower and Manitoba Hydro are both provincially owned Crown corporations operating in a monopoly environment. Government agencies are responsible for regulation of the electrical industry in both Saskatchewan and Manitoba. On the other hand, Alberta and the benchmarked jurisdictions in the United States are operating in a deregulated environment. In addition to government regulation, the regulatory systems in these jurisdictions are characterized by non-government influences such as citizens committees and contracted administrators. As a result, more time and effort appears to be expended on issues such as public involvement, schedules, and consideration of alternatives in the U.S. jurisdictions.

5.3.4 Study Area and Corridor Selection

All benchmarked jurisdictions have strong similarities in terms of procedures for identifying and establishing study areas and route corridors. The process of selecting end points is logical and consistent among the various jurisdictions. Constraint and opportunity mapping are used for the selection of route corridors. This process recognizes that some areas need to be avoided while others are more conducive to routing. All jurisdictions have a preference for using existing rights-of-way wherever practical. Total project cost is a primary consideration among all jurisdictions when considering routes.

5.3.5 Needs Assessment

The benchmarked states all have requirements for certificates of need or similar documentation which provides justification for the proposed transmission line. Part of the application process for a certificate of need is public consultation to discuss options.

In Saskatchewan, needs assessment or load forecasting is an internal process carried out by SaskPower for the purpose of long-term generation and transmission planning. The public assumes that if SaskPower builds a transmission line, it is because internal load forecasting and planning has determined there is a need. There is no regulatory requirement to study alternatives to transmission, including conservation and alternative generation. This lack of comprehensive study with attendant public review creates doubt as to valid need with some members of the public.

5.3.6 Technical Criteria

The physical design and construction of transmission lines is done according to well-established engineering standards and criteria under the direction of professional engineers. The U.S. utilities all follow provisions of the "Design Manual for High Voltage Transmission Lines" published by the U.S. Department of Agriculture. These clearances are compared with CSA Criteria in Table 4.1. Manitoba and Alberta utilities apply CSA Standard C22-3 No. 1-M87 to define design clearances and right-of-way width. Some Alberta utilities use clearances greater than CSA clearances.

All jurisdictions employ similar methods in terms of design, construction techniques, and maintenance. Few physical failures in lines and structures have been recorded, indicating that current practices are adequate.

From Table 4.1, it can be seen that the U.S. Department of Agriculture criteria provide greater clearances than CSA clearances. SaskPower currently uses CSA clearances to define minimum clearances and right-of-way width, but also has the recommended guideline EG2-196 (SaskPower 1961) that recommends greater clearances than CSA.

5.3.7 EMF Considerations

SaskPower personnel are knowledgeable on the issue of electric and magnetic fields (EMF) and stay current on emerging research and studies. This is consistent with programs in place in benchmarked jurisdictions, but certain states such as Oregon and utilities such as Bonneville Power (see Section 5.2.5.4) have put a special effort into addressing EMF concerns. The utilities collect information but make no determination of health effects. Oregon has established a special committee to monitor EMF with the results reported to the state legislature.

5.3.8 Expropriation

All benchmarked jurisdictions hold expropriation as an absolute last resort when acquiring rights-of-way, as does SaskPower. It was not possible to obtain clear information regarding the number of expropriations in other jurisdictions, and it is therefore not possible to provide a comparison to SaskPower, but considering their different legal frameworks, comparisons between U.S. and Canadian jurisdictions would not be appropriate in any case.

5.3.9 Summary

The technical aspects of design and construction of transmission lines have been refined through many years of application. This is now a mature field of practice, resulting in a transmission network with a high degree of physical reliability.

Similarly, although it is a more recent discipline, proven methodologies for assessing and mitigating biophysical impacts have been adopted by all benchmarked jurisdictions.

A summary of observations from the benchmarking review is provided in Table 5.5. SaskPower meets or exceeds the practices of the regional utilities in the technical assessment of transmission corridors, design, and delivery of the network.

The major differences among jurisdictions are in the areas of project planning and public consultation fields. Within SaskPower, network planning and capital project definition are mainly an internal management process. In the U.S. jurisdictions, most utilities are required by law to make their long-term plans known to the public, many on an annual basis.

The management of the public consultation process is also an area of variance. There is no regulatory and little policy direction on this issue in Saskatchewan, other than the SERM policy direction on preparing the project proposal. Some U.S. utilities know that lines of 69 kV or greater will be subject to an environmental impact statement and start the consultation process very early. Both Manitoba and Alberta encourage early public consultation, and most utilities incorporate it into the project planning phase.

Table 5.5
Benchmarking Comparison

Issue	SaskPower	Alberta	Manitoba	U.S. Jurisdictions
1. Demonstration of Need	No formal requirement demonstrated in project proposal.	Need Statement is required in initial application.	Need is demonstrated early in process. No formal requirement.	'Certificate of Need' requested in early stage for transmission projects. For smaller project demonstration of need may not be needed.
2. Project Proposal	Required for transmission lines.	Required for transmission projects. Submitted to Transmission Administrator.	'Workplan' required for transmission projects.	Project description is included in 'Certificate of Need' application.
3. Public Consultation	Usually part of project proposal. Required as part of Environmental Impact Assessment.	Proponent is expected to consult with landowners within 800 m of line.	Required in accordance with legislation. Participation encouraged at all key steps.	Generally required throughout all phases of project. Public hearings required for larger projects.
4. Environmental Impact Assessment	Ministers Decision. Typically required for lines 230 kV and over. May be required for smaller transmission lines.	Mandatory for line 500 kV and above; excluded for lines 130 kV and less; discretionary for line 130–500kV.	Classes of Development Regulations. EIA required for lines above 115 kV. Discretionary for lines less than 115 kV	Highly variable between states. Below 69 kV is not transmission and EIA not required. Above 69 kV EIA may be required.
5. Project Schedule (Announcement to Approval)	Usually less than one year.	Normally about 1 year but greater for larger projects.	About 2 years. More time may be required for large projects.	2 to 5 years or more.
6. Line Design Criteria	Professional engineers using Canadian Codes and Standards.	Professional engineers using Canadian Codes and Standards.	Professional engineers using Canadian Codes and Standards	National Electrical Code requirements.
7. Clearance to Dwellings	SaskPower guideline EG2–1961 is recommended in rural areas. CSA 22–3 No. 1–M87 defines minimum in rural and urban areas.	CSA 22–3 No. 1–M87 at a minimum. Utilities use clearances that may be greater than CSA.	CSA 22–3 No. 1–M87.	US Department of Agriculture 1724–200.
8. Expropriation Policy	Last Resort.	Last Resort.	Last Resort.	Last Resort.
9. Published Environmental Standards	Standards criteria do exist and are included in all projects and described in work plans and EIS. Not formally published.	Yes.	Standards criteria do exist and are included in all projects and described in work plans and EIS. Not formally published.	Standards criteria do exist and are included in all projects and described in work plans and EIS. Not formally published.
10. EMF Management	Keep up with current research. Will do measurements for homeowners.	No formal program. Landowners are provided with information and measurements if requested. Information is also provided in public consultation stages.	Keep up with current research. Hire experts to provide predictions for new projects. Will do measurements for homeowners.	Keep up with current research. Will do measurements for homeowners. Information on EMF required in public hearings.

Section 6 Public and Corporate Concerns

6.1 Opinions Heard by the Panel

The Panel heard concerns from various panel participants. Similar concerns were often expressed by both corporate staff and external stakeholders. An annotated summary of information brought before the Panel is provided, in random order, in the following paragraphs.

6.1.1 The Need for Transmission Projects

While the process for deciding whether or not transmission is needed was explained in detail to the Panel, it was clear that the public remains largely uninformed as to why transmission reinforcements are needed and what alternatives were considered. In the view of some participants, all alternatives, including that of not building new transmission lines, should be presented to the public.

6.1.2 Respect for Technical Competence

There was concurrence that SaskPower is providing economical, reliable electrical energy transmission in Saskatchewan in spite of the challenges of long distances, sparse population, and low user density in a harsh continental climate.

6.1.3 Landowner Concerns

In the of the terms of reference for the Review Panel, SaskPower recognized that land use continues to be a major factor in successful route selection. They enumerated landowner concerns as:

- *reduced privacy/security;*
- *possible lowering of property values;*
- *potential depreciation of aesthetic value of an area;*
- *inadequate line clearance;*
- *increased operational requirements for agricultural activities;*
- *the danger to aerial applicators;*
- *barriers created to future irrigation development;*
- *increased cost related to improperly applied chemical from an aircraft forced to fly at the wrong altitude for proper spray pattern (e.g. reduced weed control and resulting decreased yield);*
- *the health effects of electric and magnetic fields (EMF);*
- *the use of local contractors for construction and clearing of land;*
- *increased traffic on rights-of-way;*
- *concerns over the ever-increasing nuisance value of diagonal crossing of agricultural land;*
- *use of chemical agents for vegetation control;*

- *irreversible impacts on ecosystems as a result of right-of-way clearing and development; and*
- *long-term impacts of corridors on community development.*

While compensation was specifically excluded from the terms of reference for the Review Panel, recognition of the intrinsic value of land was raised repeatedly.

6.1.4 Other Stakeholder Concerns

Other stakeholder concerns related to ecological issues and socio-economic impacts, particularly within specific communities. Some stakeholders urged the Panel to address the need to keep the transmission network to a minimum by promoting alternative energy sources as well as the need to promote integrated land use plans within transmission corridors. The Panel was also urged to pursue aesthetic impacts as a mental health issue, in that disruption of the aesthetic environment may detract from the mental well-being of an individual, and to promote use of visual modelling to demonstrate and analyze aesthetic impact.

The Panel was also urged to recognize the concept of "community" as a valid model around which to consider impacts of transmission lines. Concern about interference with and disturbance of residences was raised repeatedly. The Panel was urged to recommend criteria that ensure routes that impact the fewest number of dwellings, as well as having the fewest "community" impacts.

6.1.5 Relationship with Regulators

SaskPower has worked hard to establish a strong working relationship with SERM, and feels that the relationship is important in executing their business. As a result of their long experience, SaskPower is very familiar with SERM's requirements and strives to meet those in each project proposal.

The Panel was advised that, on occasion, from the perspective of the public, it was difficult to differentiate between the roles and responsibilities of SERM and SaskPower leaving the public with no obvious avenue of appeal. Some panel participants were of the opinion that SERM *"rubber stamps"* SaskPower project proposals. SERM advised that it has the responsibility to administer environmental laws, regulations, and policies on behalf of the Lt. Governor in Council, and strives to do so fairly and impartially in accordance with statutory requirements.

6.1.6 Relationship with Communities

The point was made that, as a publicly owned utility, SaskPower has a responsibility to *"respect community stewardship values"* and take these into account in its routing decisions. The point was further made that some corridors may transect multiple communities with differing values that trigger quite different attitudes and responses. Successful route selection requires reaching an accommodation with each of these specific communities. The practice to date has been to try to work with each identified community in a unique fashion, in an effort to accommodate differing community values.

6.1.7 Relationship with Municipal Officials

Both elected and administrative officials within the rural and urban municipal governments feel that they can be of significant assistance to SaskPower in interpreting community response and reaching accommodation with stakeholders. At the present time, municipal governments are treated as institutions, as opposed to being recognized as informed elected decision-makers with specific knowledge of their communities.

6.1.8 Public Consultation and Willingness to Consider Alternatives

SaskPower communications were repeatedly portrayed by some panel participants as

"telling us what was going to happen" as opposed to a mutual discussion of alternatives and search for the most viable solution. The design process was represented as *"Regina based"* with minimal contact with local stakeholders during the route selection process.

There was concern that, by the time SaskPower advises the public of the routing alternatives, the decision has already been made and there is no opportunity to influence decisions through a meaningful consultation process. The Panel was told that there is *"a need for revamping of the public consultation process to get meaningful community input to route selection"*. One of the more forceful panel participants indicated that he would *"support route selection if it follows rational principles and respects community concerns"*. The Panel was also advised that *"the process will stay political if SaskPower does not change the consultation process"*.

The lack of adequate time for meaningful discussions was also raised. Several participants, private citizens and institutional representatives alike, made the case for more time for consultations to allow the process of familiarization, understanding, debate, and negotiations to take place. In their view, scheduling must also consider the nature and needs of the community; public consultations should be conducted at a time most convenient to residents and stakeholders.

SaskPower reviewed their experience in conducting some public consultations. It has been their experience that public turnout to open houses is traditionally low, indicating a low level of concern. The alternative view was that the proponent had a responsibility to ensure all potentially impacted landowners, in particular, were personally contacted, even if they did not come to the open house events.

6.1.9 Recognition of Intrinsic Land Values

Intrinsic value is the inherent value of the land for its spiritual, cultural or heritage value, a concept difficult to consider in a deterministic, economics-oriented analysis. The Panel was urged to seek a means of quantifying these qualitative aspects and were further urged to equate the *"value of aesthetics to the cost of going around the impacted property."* It was strongly represented to the Panel that not all land was of equal importance and that there were *"special areas"* that must receive consideration in addition to their economic value.

6.1.10 SaskPower Values and Policy

SaskPower's policy states that it values the environment and community relationships. However, their environmental policy focuses on the biophysical environment and is silent on socio-economic issues. The current environmental policy provides little guidance on socio-economic and public participation issues to staff assigned to deliver transmission line projects.

6.1.11 Electric and Magnetic Fields (EMF)

The Panel heard strongly made presentations regarding concerns about the dangers of EMF and the inability of either the public or SaskPower to quantify the health risks associated with EMF. No additional scientific or epidemiological data on human health effects or risks was presented.

6.1.12 Expropriation and the Willingness to Negotiate

Landowners are very aware of SaskPower's ability to expropriate land and have no doubt it will be used. Some landowners expect that attempts at a negotiated settlement will fail. This can result in reduced motivation to pursue negotiations to a conclusion.

On the other hand, SaskPower views expropriation as a last resort and implements alternate dispute resolution processes to avoid expropriation. Information was presented to the Panel that set the historical (last 20 years) expropriation rate at about 1% of all

land transactions prior to the Condie-QE project. More than 22% of the land transactions on that project resulted in expropriation, raising the overall rate in the last 20 years to about 5.1%. In the view of the Land Officers, issues external to the project itself lay behind many of the Condie-QE expropriations.

6.1.13 Clearance Standards and Guidelines

SaskPower uses several clearance criteria in establishing transmission routes.

- Minimum clearances to safely accommodate conductor wind swing and to prevent flashover are set according to CSA Standard C22-3 No1-M87 (CSA 1997). These are the minimum clearances applied to all transmission lines, whether rural or urban, and govern the width of rights-of-way. These standards presume that dwellings could be constructed at the easement line and be safe to permanently occupy.

- Recommended rural clearances are provided in SaskPower guideline EG2-1961 (SaskPower 1961). The basis of these recommended clearances cannot be found in SaskPower's file, but these guidelines provide clearances greater than the minimum CSA safety-based standards.

- Desirable informal separations of up to 160 m, depending on line size, from rural dwellings are often provided by designers, space permitting. These separations are often more easily accommodated through use of corridors running diagonal to land boundaries.

Representation was made to the Panel that the clearances may not be as rigorously applied in the cities where a right-of-way is expensive to acquire. In the view of SaskPower, safety is a prime consideration, and the routing practices in the city are no less safe than those used in rural areas.

6.1.14 Maintenance of Urban Facilities

The Panel heard both commendation and criticism of construction and maintenance practices within urban areas. On one hand, specific substations were cited as being particularly well integrated into the landscape, while other portions of the right-of-way were allegedly unkempt and poorly maintained. A consistent maintenance standard would render transmission corridors a more valued element of the urban landscape.

6.1.15 Changing Business Environment

Continental deregulation, participation in the National Energy Reliability Council (NERC) and the Mid American Power Pool (MAPP), and publication of the Open Access Transmission Tariff (OATT) will change business processes and may mean that the need for transmission lines will no longer be dictated by provincial needs, but rather by the commercial needs of outside markets. With the impacted landowners already feeling undercompensated for projects that serve their community or their province, additional resistance can be expected on projects generated from external need. On the other hand, NERC will require reporting the degree of compliance with reliability standards; this presents an opportunity for communications to inform the public of the need for ongoing improvements to the transmission network.

6.1.16 Unrecognized Mitigation Measures

SaskPower routinely implements improvements to the preferred transmission line route after consultation with landowners, other stakeholders, and regulators. For example, 60 km of existing 14.4 kV line within a waterfowl flyway were buried as a co-mitigation measure to compensate for mortality of migratory waterfowl that may result from the Condie-QE line. Other measures such as *"building on the square"* are commonly implemented where land is identified as suitable for irrigation and the landowner signifies an

intention to irrigate in the future. Double circuiting a new circuit with an existing circuit or salvaging an existing circuit and replacing it with a new circuit on the same right-of-way have both been used to avoid developing a new right-of-way. Because many of these improvements and mitigation measures are not well publicized, the degree of mitigation implemented by SaskPower during line routing and construction is not widely known, contributing to a perception of the Corporation as unresponsive and reluctant to make justifiable modifications.

6.1.17 Transmission Line Economics

The Panel was asked by some participants to quantify the impact of capital cost on electrical line rates, but the Panel lacked the information to do so. The Panel was unable to make any judgements as to the economic impact of improvements but was advised by SaskPower that, on a system basis, a 15% increase in the capital cost of the transmission system would create a 1% across-the-board increase in electrical rates.

The Saskatchewan Chamber of Commerce, while recognizing the need for environmental and social acceptability of transmission line construction, strongly argued for construction of the most economical system that would produce the lowest possible power rates for Saskatchewan consumers. Others felt that the ongoing cost of hosting these transmission improvements should not be borne solely by the landowners; but rather, improvements are a legitimate cost that should be borne by the users. The Panel was told that *"an attitudinal change is needed. The cost of mitigating impacts should be a shared cost. This approach is consistent with social attitudes of sharing and cooperation that are prevalent in Saskatchewan"*.

SaskPower advised the Panel that every project already incorporates significant capital costs that are incremental increases from the "shortest line" concept. These increases may be due to accommodation of land use patterns, environmental mitigation, or to address other stakeholder concerns. Because these costs are recovered through the electrical rates, they are already shared by all users of the system.

6.1.18 Dealing with Planned Lines Currently in Abeyance

SaskPower has suspended further route selection activities until the Panel presents its report. Time is of the essence since some communities and customers are currently at risk due to unreliable energy supply. The public recognizes the need for these projects, although some are skeptical as to whether or not all alternatives have been considered.

6.1.19 Influence of SERM Guidelines

The SERM policy guidelines for administration of *The Environmental Assessment Act* and the Guidelines for Environmental Protection from the Development of Electrical Transmission Lines (Appendix G) can be interpreted in a contradictory fashion. While the guidelines appear to direct SaskPower to existing rights-of-way and existing transportation or transmission corridors, they also emphasize the need for maintaining scenic routes and building on section lines. Since most residences in rural Saskatchewan are built near road allowances, the guideline to follow existing corridors also promotes maximum opportunity for conflict with existing landowners. In the view of some participants the contradiction within the guidelines must be rationalized.

6.1.20 Long-Term Planning

It was suggested that SaskPower attempt to consult with urban and rural municipalities in an attempt to integrate transmission planning into long-term municipal development plans.

6.2 Current Project Delivery Model

The traditional transmission line project implementation model is based on the

monopoly and the authority to manage and develop that monopoly as provided for in *The Power Corporation Act*, supplemented by *The Expropriation Procedure Act*. These absolute powers have been somewhat mitigated since 1980 by *The Environmental Assessment Act*. Nonetheless, the statutory and regulatory framework provides SaskPower with the ability and authority to deliver the most economic transmission system in the shortest possible time. Within this framework, the *lowest life cycle cost* encourages the shortest transmission line, with alternatives considered only if they are of acceptable cost, if ordered by regulators, or if the shortest line has unacceptable environmental impacts. In practice, the absolute shortest route is seldom built since many factors mitigate against choosing the shortest route.

Care is taken to minimize biophysical impact, and community consultation is undertaken to assess the acceptability of the corridor and the degree of public concern with respect to the project. While technical delivery and protection of the biophysical impacts have been exemplary, landowner resistance and socio-economic concerns have been increasing to the degree that they potentially threaten delivery of current and future transmission projects.

Section 7 Issues and Recommendations

7.1 Policy Framework

7.1.1 Corporate Values and Environmental Policy

Electrical transmission will remain a wired industry, dependent on physical occupation of land. Ongoing inspection and maintenance activities ensure that the relationship remains an active one, requiring access to the land at least twice a year. While SaskPower has the legal authority to acquire and enter rights-of-way, it would have hollow authority if public opinion limited their ability to enjoy that access or to acquire more rights-of-way. Thus, a harmonious relationship with landowners and other stakeholders who have an interest in the Saskatchewan land base is strategic to SaskPower's long-term interests.

In its statement of values, SaskPower aserts that it values *"environment and community relationships"* but this value on *"community relationships"* is not currently reflected in the environmental policy approved by the Board of Directors. This is an important issue since the value statements outline the basic beliefs of the corporation that will be reflected in the attitudes (policies and guidelines) that govern the behaviour of staff as they carry out their transmission project implementation duties.

The Environmental Assessment Act is clear in its definition of environment (see Section 3.3.2 for a complete definition). This definition includes *"the social, economic and cultural conditions that influence the life of man or community."* It is the opinion of the Panel that SaskPower has not provided adequate consideration of these aspects in the planning, impact assessment, design, and implementation of its transmission projects.

Recommendation No. 1

The Panel recommends that SaskPower revisit its value statements and environmental policy to recognize the importance of community and socio-economic values in effective environmental management. Guidance to staff (policies) will be required with respect to trade-offs negotiated in the interests of creating sound relationships with landowners and other stakeholders. Training and empowerment of staff who deal with the public on these issues are required to ensure effective implementation of the policy.

7.1.2 SERM Transmission Line Routing Guidelines

SaskPower considers the SERM criteria (Appendix G) when formulating their routing decisions. The guidelines with respect to *"preliminary route selection and survey"* suggest that *"routes of electrical transmission lines should be selected to maximize the use of existing roads and to minimize construction of new access roads. Existing corridors should be considered for route selection wherever possible providing no other significant environmental impacts are likely to result (e.g. conflict of scenic routes)."*

It should be noted that this is a guideline, not a regulation. It is a suggestion which, if

followed, should expedite project approval by SERM, which has a dual function as both regulator and resource manager.

The focus of the guideline on using existing roads for access and promoting the use of existing corridors is a limitation on siting of transmission facilities, and is in direct opposition to representation made to the Panel by major stakeholders including urban governments, representatives of urban parks, and tourism industry representatives. In addition, it appears to contradict statements presented later in the guidelines that support the retention of scenic resources. Some participants found the presence of transmission lines on some existing corridors to be aesthetically offensive while others found their presence counter to their economic interests, particularly to the tourism industry. All of these stakeholders found grounds to oppose the simplistic application of this guideline.

Recommendation No. 2(a)

The Panel recommends that SaskPower discuss revisions to this guideline with SERM. A more realistic provision would be to select corridors to complement existing and planned land use patterns. For instance, development in forested areas may be sensitively accomplished through effective coordination with forest management plans (e.g. harvesting) with lesser physical and scenic impacts than may be achieved on existing corridors. Similarly, development on existing corridors in the urban fringe can unduly influence long-term urban development patterns.

Section 2.3 of the SERM guidelines discusses vegetation and wildlife concerns with emphasis on protection of sensitive areas. It is the view of the Panel that the style of land tenure and the management practices applied to sensitive areas make these areas unique.

Recommendation No. 2(b)

The Panel recommends that Section 2.3.1 be amended by adding specific clauses with respect to protection of unique areas and landscapes, urban parks and tourist facilites.

Section 2.5 of the SERM guidelines discusses concerns relating to agriculture and other land uses. These guidelines are consistent with representation received by the Panel except for a concern expressed with respect to location on *"strips of unbroken land"* where this land may be representative of virgin prairie. In addition, the horizontal and vertical clearance requirements discussed in Section 2.5.2 of the SERM guidelines will be addressed separately.

Recommendation No. 2(c)

The Panel endorses the SERM guidelines relating to agriculture and other land uses, and encourages SaskPower to continue practices that will have minimum impact on agricultural land. The recommendation with respect to locations on field windbreaks and strips of unbroken land must be assessed independently in light of their potential value as habitat and potential biophysical impacts. Recommendations with respect to right-of-way width and horizontal clearances will be discussed separately.

Section 2.6 of the SERM guidelines deals with *"recreation, tourism and aesthetic concern."* It deals primarily with recreational land and only peripherally with the tourism component that will be discussed later in this report. The Panel heard concerns about the impact of transmission lines on unique elements in the landscape, with respect to both aesthetic impact and to the need for increased access for ongoing maintenance. It is the view of the Panel that there are areas of Saskatchewan landscape that are unique and have enhanced intrinsic value beyond their economic value. As such, these lands are worthy of additional protection through use of

routing guidelines that cause these areas to be avoided wherever possible.

Recommendation No. 2(d)

The Panel recommends that Article 2.6.2 of the SERM guidelines be amended by adding the following:

- **Areas of landscape deemed unique or of limited extent in Saskatchewan by reason of the type of landform, land use, morphology, or geology, or by reason of its scenic, aesthetic, or spiritual value to the community.**
- **Urban parks and institutional green spaces.**
- **Tourist facilities or access routes or important tourist destinations.**

7.1.3 SaskPower Environmental Management Policy

SaskPower has environmental protection guidelines in place for the development and operation of transmission lines. SaskPower has not formalized a corporate code of practice in this area and existing environmental protection policies and procedures do not appear to be well known by the public. The public, especially landowners that must host SaskPower operations, expect to have corporate policies clearly defined before they enter into transactions with the corporations. SaskPower operations also cover areas that extend beyond the scope of the SERM guidelines. Internal guidelines would provide guidance to staff and assist in interpreting management practices to the public.

Recommendation No. 3

The Panel recommends that SaskPower formalize and adopt comprehensive environmental protection guidelines that would meet or exceed current regulatory requirements and would govern practices in the location, evaluation, design, construction, and maintenance of the transmission network.

7.2 Planning Framework

7.2.1 The 10 year Load Growth Forecast

SaskPower currently undertakes an annual review of load growth and forecasts loads 10 years into the future. This is done for internal planning purposes, but its use could be expanded to keeping the public apprised of the state of the network and the general need for long-term system upgrades. It could be a valuable tool in gaining public acceptance of the need for improvements to sustain system reliability. The requirements of the state of North Dakota (Section 5.2.3) may be of assistance in designing the content of the annual review.

Recommendation No. 4

The Panel recommends that SaskPower annually publish and communicate to stakeholders a 10 year forecast of load growth that assesses system reliability, identifies upcoming deficiencies, and outlines a general plan of improvements to address them.

7.2.2 The 5 year Capital Project Forecast

The annual 5 year capital budget outlines SaskPower's transmission improvement investment plans for the next 5 years. It is used for internal purposes to manage the work of the corporation, but would have extended value in advising the public of projects planned in the next 5 years. The budget could form the basis of forecasting the flow of projects in the next 5 years.

Recommendation No. 5

The Panel recommends that SaskPower annually publish a capital investment plan that outlines the transmission improvements planned for the next 5 years. The plan should be detailed and comprehensive and include the reason for the investment; the location, probable type, and capacity; the estimated cost; and the expected dates of public review and commissioning.

7.2.3 Urban Fringe Areas

SaskPower needs assured access into the urban municipalities and the ability to develop a series of corridors around the municipalities in order to provide reliable electric service. The location of transmission corridors and substations in urban fringe areas can strongly influence urban development patterns. Development of functional, economical communities requires coordination of development activities between the province, the municipalities, the major utilities, and other interests.

Recommendation No. 6

The Panel recommends that an effective long-term planning process be established between the major urban municipalities in Saskatchewan and the Engineer (Lines and Stations) with a view to facilitating coordinated long-term development plans within 5 km of existing urban boundaries.

7.2.4 Relationships with Major Urban Parks

The cities of Moose Jaw, Saskatoon, and Regina have major urban parks centered on the waterways that transect the cities. These parks are the result of multi-lateral cooperation and are governed by boards agreed to by the participants. In their makeup and style of governance, it must be assumed that they reflect local community values. In addition, the public has invested considerable resources to protect and improve these parks. SaskPower transmission lines also cross the parks. All of these parks incorporate sensitive landscape. A long-range approach, working cooperatively to manage and preserve these lands, is important to these institutions, as are aesthetics and sensitive management of the environment. For instance, lines and structures should be incorporated into the landscape to the maximum possible extent, and sensitive or unstable lands should be avoided. Where impacts are unavoidable, opportunities for co-mitigation, e.g. investing in enhancements in other areas, are available.

Recommendation No. 7

The Panel recommends that SaskPower work cooperatively with the major urban park authorities to resolve routing and land management issues in the parks and their environs, respecting the community values that were instrumental in establishing those facilities.

7.2.5 Highways and Utilities

Saskatchewan Highways and Transportation, SaskPower and other Saskatchewan utilities share a common interest in that they all attempt to manage their major corridors with minimum landowner impact.

Recommendation No. 8

The Panel recommends that SaskPower be the catalyst in facilitating the ongoing participation of Saskatchewan Highways and Transportation (SHT), SaskEnergy, and SaskTel in a more comprehensive planning process. In addition, the Panel recommends enhancement of existing interaction with SHT to provide that agency with both the 5 year capital program and advice on

approved capital projects that may impact the highway system.

7.2.6 The Tourism Industry

Development of the Saskatchewan tourism industry has been a major public policy and economic initiative, one that has been supported by both public and private investment. Major marketing initiatives have been undertaken, marketing Saskatchewan as a pristine natural environment. This natural environment was the basis for a 1.3 billion dollar industry in 2000. Visual impairment detracts from tourism potential and negates these marketing efforts. Areas of sensitivity include: major tourism corridors (e.g., No. 2 Highway north of Prince Albert and No. 4 Highway in the Meadow Lake area); unique landscape features such as our major valleys, open grassland, and sand dune areas; and major tourist destinations such as resort areas and the major urban parks. Specific concern was also expressed with respect to remote outfitter camps that particularly rely on the wilderness ambiance. The industry has developed extensive databases and can provide advice on the location of facilities, operators, or terrain of particular interest to them.

Recommendation No. 9

The Panel recommends that SaskPower establish an ongoing consultative process with Tourism Saskatchewan to keep abreast of developments within the tourism industry with a view to maximizing benefits to both parties.

7.3 Public Consultation

7.3.1 The Concept of Community

Throughout its business activities, SaskPower has recognized the importance of public involvement in major decisions that affect business directions. Effective socio-economic evaluation is needed to characterize the nature of the communities that will be affected, outline the social and economic linkages to the project, and identify the issues that are likely to arise in response to the project proposal.

It is worthwhile to examine the concept of "communities" as it is used in the ecological context. Three elements are inherent within the concept of community:

- **Social interaction** or "community as communion," a place characterized by trust, friendship, reciprocity, and loyalty;
- **Common ties** creating shared interests and resulting in solidarity among members; and
- A **geographic area** that bounds the members, whether defined by common interest, values, culture, or economic activities.

In light of the above, Susseman (1959) offers the following definition:

> *A community is said to exist when interaction between individuals has the purpose of meeting individual needs and obtaining group goals — a limited geographical area is another feature — the features of social interaction, structures for physical, social and physical [sic] needs, and limited geographical area are basic to the definitions of community.*

In the context of this definition, multiple "communities" can be expected to exist in any extensive linear corridor. The purpose of the public consultation program is to identify these communities, to understand their sensitivities, and to work collaboratively towards negotiated solutions.

Recommendation No. 10

The Panel recommends that SaskPower adopt a "community-based" approach to social and economic evaluation of transmission line corridors and direct its efforts

at mitigating impacts on the identified communities.

7.3.2 The Public Participation Process

Public participation should facilitate real, transparent, interactive, collaborative involvement of all those impacted in decision making in a fashion that works to the mutual benefit of the parties.

The public participation process should be based on the public consultation plan. The consultation plan should:

- define the communities, their interests and sensitivities;
- recognize all interested members of the public, including landowners, local residents, community groups, environmental groups, municipal governments and stakeholders outside the community;
- provide for various means for them to be informed at all stages of the study, to offer ideas and information, to react to proposals in order to influence recommendations and decisions, and to be informed of decisions that are made;
- provide for various means to receive public input;
- negotiate acceptable solutions; and
- inform participants of results and decisions.

The work plan for public consultation will normally provide for multiple stages of activity including dissemination of project information, confirmation of issues, examination of all alternatives, and review of conclusions. This is an iterative process that is dependent upon openness, transparency and having all participants well informed of project details. Implementation of the public consultation plan may include:

- ongoing consultation with the public through the media and customer communications during the long-range planning process to keep them informed of the state of the network, potential deficiencies, and the possible need for system reinforcements;
- detailed briefing of the executive, board of directors, and elected municipal and provincial officials at various stages of the process;
- developing a project proposal and public consultation work plan and ensuring all members of the project team are well informed of project details, especially those who have contact with regulators or stakeholders;
- briefing the minister responsible for SaskPower and government M.L.A.s in constituencies potentially affected by a proposed project prior to project announcements;
- briefing the opposition critic for SaskPower and Environment, and M.L.A.s in affected constituencies prior to project announcements;
- publicly announcing and advertising the project;
- announcing the 10 year load forecast and 5 year capital program;
- immediately thereafter, issuing a personal invitation to elected municipal officials and administrators in affected municipalities to attend a briefing on the project at a conveniently scheduled meeting;
- contacting affected landowners and stakeholders by telephone and following up with a letter and an executive summary of the project proposal;
- scheduling one-on-one appointments with trained facilitators at an open house to discuss stakeholder perceptions and concern; providing a written summary of each interview and asking

each stakeholder to complete a project questionnaire;

- scheduling on-property visits to evaluate opinions of landowners or stakeholders who do not appear at open house functions;
- collating responses, prioritizing issues, and circulating a summary to stakeholders and regulators;
- examining alternatives and negotiating project modifications with affected stakeholders;
- communicating results and decisions to all stakeholders;
- recording the conclusions of the public consultation process and filing an addendum to the project proposal. This would officially start the environmental impact assessment process.

Recommendation No. 11

The Panel recommends that SaskPower implement an enhanced public participation process that addresses the above issues. To be successful, the process must encourage dialogue in an atmosphere of openness and collaboration. It would commence in the project planning phase, beginning with an annual review of the 10 year load forecast and 5 year capital program. It would include a comprehensive program for public participation during the corridor assessment phase, and would result in a negotiated mitigation plan.

7.3.3 Consultation with Local Governments

Local municipal governments are comprised of elected members who daily live and do business in their communities. They possess an intrinsic understanding of values and attitudes that prevail in their communities and are responsive to them. Their local knowledge could be of exceptional value to SaskPower if it is strategically used during project development, especially for characterization of the social and economic issues that might arise during corridor location, design, and construction.

Recommendation No. 12

The Panel recommends that SaskPower develop processes to more actively utilize the knowledge of the individual members elected to municipal governments and councils as early as possible in the project development cycle. In developing these relationships, SaskPower must be sensitive to the jurisdiction and interests of local government.

7.3.4 Scheduling Public Consultation

Project implementation demands often control the schedule for making public announcements and interacting with the public. To be successful, public consultation schedules must also meet the needs of stakeholders. Different communities have differing time constraints, but it is incumbent on the proponent to adjust consultation schedules to ensure that dialogue with the public is both comprehensive and representative.

Recommendation No. 13

The Panel recommends that SaskPower continue to evaluate the needs of the communities and individual landowners in establishing the time, place, and style of public participation in order to promote the fullest possible engagement of all stakeholders.

7.4 Preparing the Corporation

7.4.1 Preparing the Corporation to Support the Routing Process

As a Crown corporation, SaskPower is subject to influence by external stakeholders who exercise their democratic rights to appeal to their elected representatives or SaskPower executives to preempt or modify routing decisions. It is essential that all sectors of the corporation be prepared to discharge their roles and responsibilities in support of transmission project implementation. This requires:

- Communicating project details and public consultation work plans to internal and external stakeholders including:
  - the project team;
  - executive;
  - board of directors;
  - minister responsible for SaskPower and affected members of her/his caucus; and
  - opposition critics and affected members of their caucuses.
- Ensuring that due process is provided for in all aspects of dealings with the public and stakeholders. This includes full and timely disclosure, open and transparent communications, and allowing sufficient time for stakeholder and regulatory review and response. With respect to stakeholders, it also means ensuring that there is a well-defined avenue for appeal of decisions.

Integrity of the process means that elected decision makers must be kept completely informed as to the progress of consultations, but the decisions with respect to project implementation should remain within the corporation.

Recommendation No. 14

The Panel recommends that SaskPower implement a program to inform SaskPower staff and elected officials as to project details and their individual roles and responsibilities in the routing process. The project implementation plan must make provision for due process and identify avenues of appeal. It is recommended that an appropriate SaskPower officer be designated to resolve stakeholder appeals.

7.4.2 Staff Assignment and Training

Several of the regional utilities that were bench-marked emphasized the importance of individual skills in achieving success in transmission projects. People leading discussions with the public and interpreting responses must be able to create relationships that will foster progress rather than stalemates. The importance of continuity and empowerment of these knowledgeable contact persons was discussed earlier.

The key positions are the overall project managers and team leaders for public participation and line design. Bonneville Power Administration (Section 5.2.5.4) stated that:

Project managers with good communications skills, a collaborative style and the ability to compromise tend to have the greatest success in completing new transmission line projects. Open public decision-making and public involvement methods today seem to have a major influence on a project's success.

Recommendation No. 15

The Panel recommends that SaskPower give high priority to reinforcing project management skills to ensure that the skills and knowledge critical to achieving negotiated, collaborative solutions are current and maintained at a high degree of profi-

ciency among project managers. It is also recommended that careful attention be paid in making key project assignments to ensure that the appropriate skills and knowledge are applied in critical areas.

7.5 Corridor Selection and Evaluation

7.5.1 Corridor Selection

The potential for reinforcing a transmission system arises when network demands cannot be supported by existing facilities. Preparing the public and multiple stakeholders for the possible need for transmission improvement should begin at that time. More time than is currently provided is needed for the public to digest project information and to participate in decision making in an informed manner. The benchmarked regional utilities are budgeting from 2 to 5 years from capital approval to commissioning.

A revised routing process is illustrated in Figure 7.1. The components of the process are as follows:

- A project planning phase consisting of:
  - Identifying potential projects from the 10 year load growth forecast and 5 year capital plan and maintaining ongoing dialogue about this need with the public and customers.
  - Validating and justifying the need and communicating the results to internal and external stakeholders by:
    i) identifying available alternatives, including the impact of conservation and not constructing any new lines;
    ii) identifying the preferred solution; and
    iii) documenting the needs study for inclusion in project proposal.
  - Preparing the capital project approval.
- A corridor selection phase consisting of:
  - Biophysical and socio-economic screening to identify constraints for preliminary corridor selection.
  - Selecting a preferred corridor and identify reasons for the preference.
  - Preparing and submitting the project proposal, which includes validation of the need and a public consultation work plan;
- An assessment phase that entails:
  - Implementing a public participation program to identify community concerns and potential mitigation measures.
  - Conducting field biophysical characterization of preferred corridor.
  - Negotiating mutually acceptable corridor modifications.
  - Communicating the results of public participation and environmental screening to stakeholders and regulators.
  - Preparing the EIA or, if not required, filing an environmental protection plan; and,
  - Obtaining necessary approvals and licensing.

Recommendation No. 16

The Panel recommends that SaskPower adopt a revised corridor selection strategy that addresses the issues discussed above, allocating sufficient time and resources to achieve the desired results.

7.5.2 The Corridor Assessment Process

The Environmental Assessment Act lays out the legal requirements for the EIA process. SERM has developed policies to guide proponents through the assessment process. The Saskatchewan Environmental Assessment and Review Process (1996) document and the Guidelines for Environmental Protection from Development of Electrical Transmission Lines (Appendix G) provide administrative advice to proponents of electrical transmission projects.

These policy statements, which have no formal status in the act, lay out the commonly accepted processes that SaskPower is expected to follow in assessing environmental impact and developing environmental protection plans for transmission lines.

To initiate the assessment process, the proponents are asked to submit a project proposal for technical and public review to determine if the project is a "*development*" within the definition of the act. If the project proposal lacks sufficient detail, SERM will ask that additional information be provided. Particular attention is paid to the public consultation aspects. The policy states that

> *"proponents are encouraged to establish early contact with the public and local government officials in all jurisdictions which could be affected by the proposed project, or by any alternative being considered, to inform them about the planned project and seek their reaction to it. The extent and outcome of all such contacts should be reported in the project proposal."*

For projects in sensitive jurisdictions, this approach to public consultation is problematic. The regulator wishes to have an indication of the degree of public concern in the project proposal, but the impact assessment process does not officially start until the project proposal is filed. Thus, much of the early consultation may be outside the EIA process, while the public prefers that SERM project officers be officially included in the process as independent assessors.

Recommendation No. 17

The Panel recommends that SaskPower negotiate a revised approach to administration of the project proposal to facilitate the project proposal being filed in two parts. It is important that basic information with respect to the project- e.g. physical, logistical, and engineering details outlining the constraints to corridor selection, alternatives considered (only the corridors that SaskPower is prepared to build on should be considered), the preferred corridor, and why it was selected- be presented as early as possible after capital project approval has been received. This preliminary project proposal would include screening level information on the biophysical and socio-economic environment, and would present a work plan for public consultation. This plan would become the basis of the public consultation activities. An addendum to the project proposal would be issued at the conclusion of public consultation, recording the results of the program and outlining project modifications that resulted from that activity. This would complete submission of the project proposal, formally triggering its consideration under the Environmental Assessment Act.

If the project is not defined as a development under the Environment Assessment Act, the project can progress to the construction phase, subject to acquisition of other permits and approvals. In the event the project is deemed to be a development requiring ministerial approval under *The Environmental Assessment Act*, then an environmental impact assessment is required and project specific guidelines for that assessment would be issued by SERM.

In either case (whether a development or not a development), it is imperative that the process be carefully managed

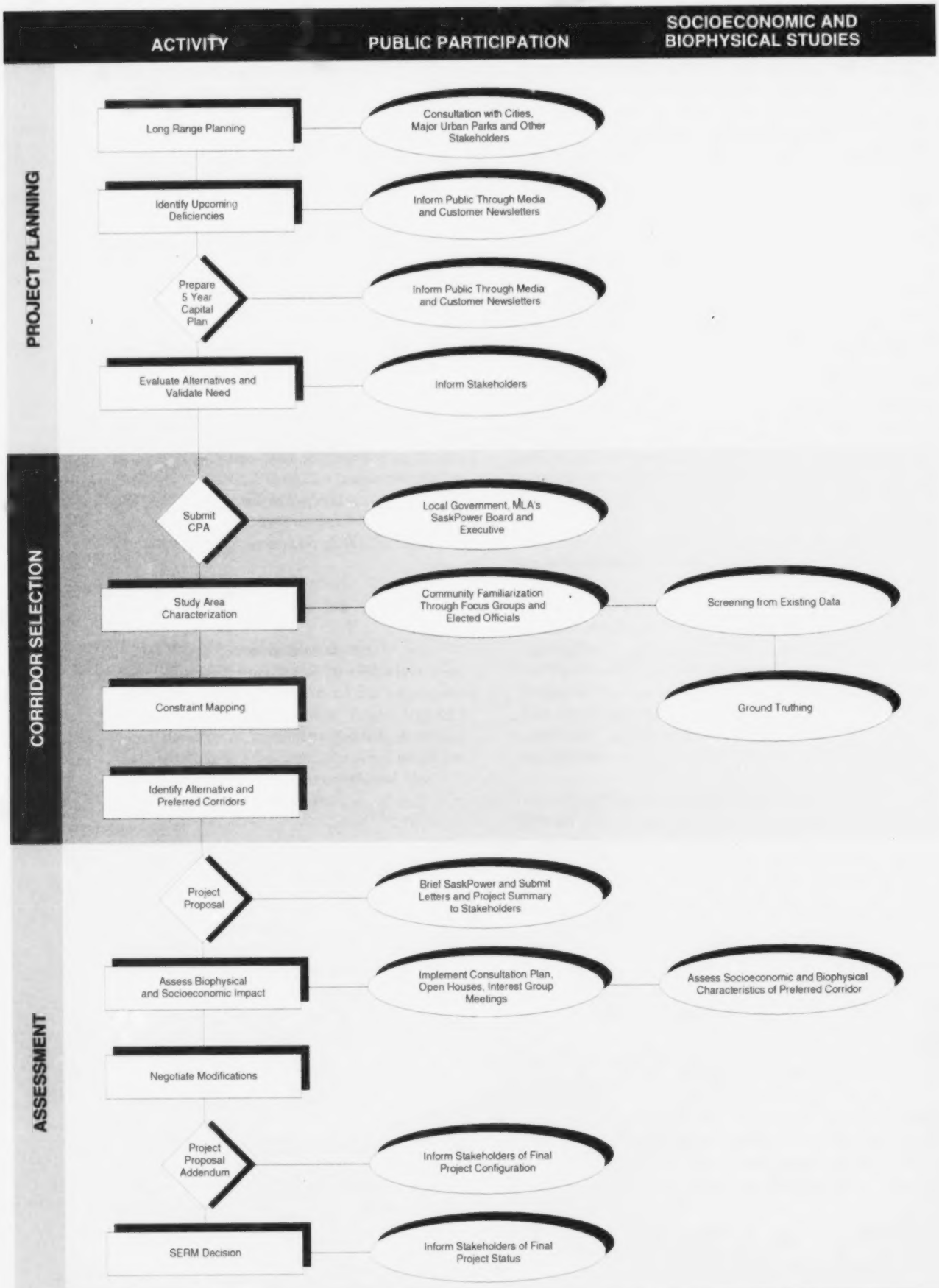
ACTIVITY
PUBLIC PARTICIPATION
SOCIOECONOMIC AND BIOPHYSICAL STUDIES
PROJECT PLANNING
Long Range Planning
Consultation with Cities, Major Urban Parks and Other Stakeholders
Identify Upcoming Deficiencies
Inform Public Through Media and Customer Newsletters
Prepare 5 Year Capital Plan
Inform Public Through Media and Customer Newsletters
Evaluate Alternatives and Validate Need
Inform Stakeholders
CORRIDOR SELECTION
Submit CPA
Local Government, MLA's SaskPower Board and Executive
Study Area Characterization
Community Familiarization Through Focus Groups and Elected Officials
Screening from Existing Data
Ground Truthing
Constraint Mapping
Identify Alternative and Preferred Corridors
ASSESSMENT
Project Proposal
Brief SaskPower and Submit Letters and Project Summary to Stakeholders
Assess Biophysical and Socioeconomic Impact
Implement Consultation Plan, Open Houses, Interest Group Meetings
Assess Socioeconomic and Biophysical Characteristics of Preferred Corridor
Negotiate Modifications
Project Proposal Addendum
Inform Stakeholders of Final Project Configuration
SERM Decision
Inform Stakeholders of Final Project Status

FIGURE 7.1 RECOMMENDED PROCESS FOR TRANSMISSION LINE PLANNING

to ensure early, open, and transparent communications with stakeholders throughout the project evaluation process so that the process can move forward in a fashion that enables timely decisions to be rendered.

7.6 Landowner Relationships

7.6.1 Landowner and Stakeholder Contact

The land officer responsible for right-of-way acquisition is the primary contact with landowners after the preferred corridor is identified. A designated project manager is the contact during the corridor assessment phase. It is important that there be continuity of contact and that the corporate representatives be well informed and authoritative, able to facilitate negotiated decisions between SaskPower and stakeholders.

Recommendation No. 18

The Panel recommends that SaskPower continue to enhance the quality of interaction of its representatives with the public, ensuring the continuity of knowledgeable, motivated, well-trained, empowered staff in key contact roles throughout the project delivery cycle.

7.6.2 Resolving Landowner Disputes

Resolution of landowner concerns receives a great deal of attention from SaskPower. While compensation was specifically outside the scope of the Panel, the Panel did hear representation regarding use of expropriation. The use of alternative resolution techniques is more desirable than expropriation.

Recommendation No. 19

The Panel recommends that SaskPower continue to emphasize negotiated solutions as the basis of its interaction with landowners, utilizing alternative dispute resolution techniques as appropriate and reserving expropriation as a last resort, such as in the case of emergencies or as a fallback solution for irreconcilable differences.

7.6.3 Right-of-Way Acquisition

SaskPower has attempted to maintain consistency in the administration of its right-of-way acquisition policies and has from time to time conducted a review of the principles behind the policies. "The Report of the Compensation Review Board" was prepared by W.E. Turner, J. Lakey, and D. Oleksyn in 1980 and has been subjected to periodic reviews, with the last major review completed in 1991.

Recommendation No. 20

The Panel recommends that the Compensation Review Board report on right-of-way acquisition policies be revised to reflect current conditions and that it be updated at regular intervals to respond to changing land use practices and economic conditions.

It is further recommended that SaskPower conduct an economic analysis of the benefits of diagonal crossing of farmland on power rates to the consumer and review the right-of-way acquisition policy accordingly.

7.6.4 Minimizing the Number of Affected Landowners

The degree of social impact is approximately proportional to the number of landowners being affected and the amount of right-of-way being acquired, assuming that impacts to other stakeholders are relatively constant. It was clear from information brought before the Panel (see Section 6.1) that SaskPower is cur-

rently making considerable effort to minimize right-of-way requirements either by double circuiting on existing rights-of-way or by constructing new circuits on existing rights-of-way. This, along with maximizing efforts to minimize the number of affected properties, is a step towards reducing social impacts.

Recommendation No. 21

The Panel recommends that, other environmental considerations and economic impact being equal, SaskPower locate transmission corridors to impact the fewest number of landowners possible. It is further recommended that, to reduce future right-of-way requirements, SaskPower place increased emphasis on reinforcement options that maximize use of existing rights-of-way where this is technically feasible and does not detract from long-term system reliability.

7.6.5 Who Should Pay?

Landowners feel that they are involuntary participants and should not be inconvenienced for the benefit of the public at large, particularly when that public may be well beyond the limits of their own community. Further, the inconvenience and nuisance may be exacerbated in the future as agricultural practices change. If these changes occur, the landowner may be locked into one-time compensation while perennial benefits accrue to the corporation and energy users. The landowners feel they should share in these long-term benefits.

Recommendation No. 22

The Panel recommends that SaskPower continue to be responsive to landowner concerns and undertake a reasonable program to address these issues. It is recommended that SaskPower evaluate the impact of capital cost increases of transmission facilities on electrical rates and be prepared to answer to the issue of the impact of routing modifications on user power rates during the public consultation process. It is recommended that an adequate capital cost contingency sum be made available during project implementation to implement discretionary changes to alleviate valid landowner and other stakeholder concerns.

7.7 Technical Issues

7.7.1 Electric and Magnetic Fields Effects on Human Health

Concerns about the impacts of electric and magnetic fields (EMF) on human health were communicated to the Panel, but no specific recommendations with respect to required separations were provided. SaskPower maintains a watching brief on this issue, regularly reviewing research and literature. While it is clear that the highest EMF exposures may occur within private dwellings or in the workplace, the public remains concerned about EMF exposure from transmission lines. Other utilities in the region are aware of public concern and could be useful collaborators on this issue (see particularly Bonneville Power Administration, Section 5.2.5.4).

Recommendation No. 23

The Panel recommends that SaskPower continue to maintain a watching brief on EMF research and regularly communicate results to the public. In the meantime, application of the principal of *"prudent avoidance"* is recommended through practical maximization of separation between transmission lines and dwellings or work areas.

7.7.2 Clearance and Right-of-Way Standards

The approaches to determination of clearance requirements and right-of-way widths were discussed earlier in this report (Section 5.3.6). Safe and aesthetic rights-of-way are a particular concern in urban areas.

Recommendation No. 24

The Panel recommends that SaskPower continue to apply CSA Standard C22-3 No. 1-M87 to define minimum safe clearances for its transmission conductors and in defining minimum right-of-way widths. It recognizes that the SaskPower guideline EG2-1961 is now obsolete and recommends that it be replaced with CSA Standard C22-3 No.1-M87, the Standard commonly used by utilities in other provinces. The Panel also recommends that SaskPower continue to obtain sufficient urban rights-of-way to allow application of the CSA clearance standards in the same fashion as they are applied in rural areas. At the same time, continued application of the principle of "*prudent avoidance*" is recommended to achieve a separation of up to 160 m between transmission lines and dwellings or workplaces in rural settings where this may be practically achieved.

7.7.3 Urban Right-of-Way Maintenance

Properly designed and maintained transmission corridors can be a desirable element of the urban landscape. The need for a corporate environmental management policy which defines appropriate right-of-way maintenance guidelines was discussed earlier in Section 7.1.3.

Recommendation No. 25

The Panel recommends that SaskPower continue to apply CSA Standard C22-3 No. 1-M87 to define minimum urban right-of-way widths (see Section 7.7.2 above). It is further recommended that SaskPower develop and apply uniform maintenance standards to its urban rights-of-way to achieve a quality of landscape not lower than that which prevails in major linear corridors such as urban freeways.

7.7.4 Aesthetics

The scenic quality of the Saskatchewan landscape has intrinsic value whether in cultivated or forested areas. The uncluttered natural view is valued by both residents and visitors. Well-accepted techniques exist to analyze the visual sensitivity of the landscape and integrate structures and facilities into the landscape in a manner that will minimize visual impacts, particularly in sensitive areas. An earlier recommendation (Section 7.1.3) addressed the need for internal guidelines for environmental design, including aesthetics.

Recommendation No. 26

The Panel recommends that analysis of aesthetic impact and design to mitigate or co-mitigate these impacts become a routine part of route selection and design, and that suitable design guidelines be developed. It is further recommended that the project delivery teams receive training and retain specialist advisors to assist in design within sensitive areas such as in the visually impacted zone around dwellings, at unique landscape features, in urban corridors, in tourism corridors and in the urban parks.

7.8 Projects Currently in Abeyance

SaskPower has transmission projects at various stages of development at different locations in the province. It has committed to deferring implementation of planned transmission projects until the Review Panel has submitted its report. SaskPower also requested recommendations from the Panel on how to proceed with these projects. Some of the planned projects have not yet been approved, while others have undergone extensive public consultation.

It is the view of the Panel t! at sufficient public consultation has been undertaken on some projects to define the issues of concern to the affected communities. It is also apparent that SaskPower has advanced the studies on these projects to a sufficient degree that the need can be demonstrated and validated, the issues defined, and project modifications negotiated to the mutual satisfaction of the parties.

Recommendation No. 27

The Panel recommends that SaskPower proceed with the deferred projects in a fashion that incorporates as many of the recommendations of this report as possible:

- **For planned projects that have not yet received Capital Project Authorization, it is recommended that this revised process be implemented to the maximum extent possible.**

- **For deferred projects that have been approved and for which extensive consultation has already occurred, it is recommended that a project proposal be filed as soon as practicable. This proposal should demonstrate and validate the need for the project, outline the alternatives studied to satisfy that need, and outline the reasons why the transmission alternative was selected. The project proposal should also incorporate the biophysical and community constraints to corridor selection, outline the alternative corridors considered, designate the preferred corridor, and state the reasons for its selection. Potential biophysical impacts and their mitigation should be outlined and the work plan for additional public consultation presented. The project proposal should be filed with SERM and distributed to stakeholders as a factual resource to be used in the public involvement process.**

- **A public consultation program should be implemented under the guidance of a third party facilitator where appropriate, to confirm issues and identify and evaluate alternatives to resolve these issues.**

- **Project modifications should be discussed with stakeholders and all stakeholders be advised of the decisions reached.**

- **The results of the public consultation process should be documented and filed as an addendum to the project proposal. This filing would complete the project proposal submission and permit a decision on whether or not the project is a "development."**

Section 8 Closure

8.1 Future Directions

SaskPower has an exemplary seven-decade record of providing economical, reliable electrical energy through a transmission network that serves electrical customers in Saskatchewan. It has traditionally relied upon the statutory and regulatory framework to enable it to select routes for transmission lines and achieve access to land to allow construction, operation, and maintenance of the transmission system.

Passage of the Environmental Assessment Act in 1980 significantly modified the legal framework, enabling the public to participate in route selection decisions to ensure their concerns with respect to biophysical and socio-economic impacts were considered.

Changing public attitudes with respect to the need and desirability of new transmission facilities has necessitated a change in project delivery methods. A wider range of public concerns must be considered in a fashion that maintains integrity of routing process.

The Review Panel has considered the information brought before it and has concluded that the policies and processes that govern the engineering, evaluation, and mitigation of biophysical impacts meet or exceed those applied in the adjoining jurisdictions. It is the opinion of the Panel that the Saskatchewan public has been well-served by the processes concurrently employed in these areas. Upon review of methodologies to involve the public in the decision-making process; however, the Panel concluded that improvements could be made.

The Panel recognizes the valid public concerns that have arisen around transmission projects during the last two decades. Ever more complex issues arise and these must be resolved to the satisfaction of an ever increasing number of stakeholders. Some exist due to misapprehension, some persist due to inadequate communications, and some will be resolved only through intensive negotiation between the parties. In a few instances, other remedies must unfortunately be sought.

After consideration, the Review Panel has recommended modifications to existing processes, particularly with respect to the public participation component of the corridor and route selection. The traditional project delivery model was based on the authority of legislation supported by the courts and judicial processes. The recommended delivery model would be based on negotiated solutions and responsive interaction between the parties.

Recommendation No. 28

The Panel recommends that SaskPower strive for a project delivery model that:

- **is based on a demonstrated need for the transmission project validated by transparent assessment of alternative solutions;**
- **is founded on informed community acceptance rather than community resistance;**
- **is based on an understanding of the community and their perception of the issues;**

- **is implemented by trained staff knowledgeable in collaborative techniques to achieve routes acceptable to stakeholders;**
- **is supported by internal corporate processes and resources, coupled with adequate time to achieve negotiated solutions;**
- **includes continuous community consultation initiated during capital project planning activities;**
- **includes a project assessment phase conducted under The Saskatchewan Environmental Assessment Act in a fashion that emphasizes the independence of the regulators; and**
- **is based on sound engineering and environmental science coupled with enhanced participation at the local level.**

8.2 Expression of Appreciation

The Panel would like to express its appreciation to all members of the public, SaskPower staff, and other organizations and institutions who gave so freely of their time to assist us. We would also like to particularly thank Mr. Greg Vogelsang, P.Eng., P.Geo, who, in his capacity as Panel Manager, added immense value to our work. The Panel appreciates each effort and contribution and hopes that our collective efforts may contribute to some of the future successes in ensuring a reliable electrical energy transmission system in Saskatchewan.

Appendix A Panel Biographies

A Wayne Clifton

Wayne Clifton is senior principal of Clifton Associates Ltd., consulting engineers and scientists established in 1978. Prior to that, he held senior engineering positions in both the consulting and public service sectors.

Dr. Clifton graduated from the University of Saskatchewan with a Bachelor of Science in Civil Engineering in 1963 and a Master of Science in Civil Engineering in 1966. He attended Imperial College of Science and Technology, University of London, receiving a Diploma in Civil Engineering and Soil Mechanics, and a Master of Science in Soil Mechanics from the University of London in 1967. In 1996 Mr. Clifton was awarded an honorary Doctor of Science degree by the University of Saskatchewan.

Dr. Clifton has been licensed as a professional engineer in Saskatchewan continuously since 1966 and is a member of the Associations of Professional Engineers of British Columbia, Alberta and Manitoba. He is currently a Fellow of the Canadian Society of Civil Engineers, the Engineering Institute of Canada, and the Canadian Academy of Engineering. He is a member of the American Society of Civil Engineers, and a member of a number of technical and professional organizations. He is currently a member of the National Research Council, The Advisory Committee for the Institute for Construction Research, and the Standards Council of Canada Advisory Committee on Trade. He is past president of both the Association of Consulting Engineers of Saskatchewan and the Association of Professional Engineers of Saskatchewan. He has served as a director of the Association of Consulting Engineers of Canada, director of the Canadian Council of Professional Engineers, and as both director and vice-president of the Canadian Geotechnical Society where he was chair of the Geoenvironmental Division. He is currently chair of the Board of the Saskatchewan Trade and Export Partnership (STEP).

Dr. Clifton was awarded the 1994 Gold Medal for Distinction in Engineering by the Association of Professional Engineers of Saskatchewan, and in 1996 was awarded the Canadian Pacific Medal by the Engineering Institute of Canada.

He has consulted on more than 2000 projects related to engineering and environmental issues, including transportation, mining, waste management, municipal and industrial development. He has participated in boards of review and several inquiries relating to transportation and mining projects, including technical advisor to the FEARO panel examining the Rabbit Lake uranium mine expansion. In addition, he has consulted on policy development in areas of environmental regulation, ground water management, land use classification and waste management.

Dr. Clifton has also been active in community affairs. He is past provincial commissioner of the Boy Scouts of Canada, a past director of Power Greenhouses Inc., and has served as a governor of the Saskatchewan Baseball Association. As well, he has been a fund-raiser for a variety of community causes, and was a recipient of the Canada 125 Medal for Community Service.

Dr. Clifton is married to Anita and they

have two sons; one holds degrees in chemistry and in Civil Engineering and the other is a mechanical engineer.

David A Gauthier

B.A. (Geography, Calgary); M.A. (Geography, Waterloo), Ph.D. (Wildlife Biology, Waterloo)

Dr. Gauthier was born in Regina, and while having traveled extensively, has lived in Regina with his wife and two children for the past 15 years.

He is currently the executive director of the Canadian Plains Research Center, University of Regina and a professor in the Department of Geography.

Dr Gauthier is directing a multi-year, interdisciplinary study of human adaptations to change on the prairies of Saskatchewan, and is co-directing an international training program in regional sustainable development. He has taught a variety of courses at the university, including natural resource management, environmental issues, geographical information systems (GIS) and spatial statistics, biogeography and physical geography. Recently, he organized the first graduate course at the University of Regina on interdisciplinary approaches to environmental sustainability. Dr. Gauthier's current research areas include:

- Rural social cohesion
- Protected ecological areas planning and management
- Applications of GIS in natural resources management
- Ecological land classification
- Human adaptations to climate change

He is a member of the Board and treasurer of the Canadian Council on Ecological Areas, a trustee of the Nature Conservancy of Canada, a member of the National Atlas of Canada Steering Committee, a member of the Grasslands National Park Management Planning Committee, and a member of the Saskatchewan Prairie Conservation Action Plan Steering Committee. He directs the University of Regina Press, and serves as an editorial board member for the *Great Plains Journal*. He administers GIS service bureaus for the national parks in Saskatchewan. He is also a member of numerous professional organizations.

Fred J. Sutter

Fred Sutter was born in Shaunavon and raised on a farm in that district.

He recently retired after 40 years of diverse municipal experience in various locations throughout the province. Immediately prior to his retirement he served 18.5 years as municipal administrator of the Rural Municipality of Corman Park, Saskatoon.

Mr. Sutter's municipal administrative career includes assistant town administrator, Humboldt, administrator, R.M. of Glenside, Village of Climax and R.M. of Lone Tree, Town of Shellbrook and R.M. of Shellbrook and the Town of Esterhazy.

He also served as a municipal administration advisor, Department of Municipal Affairs for seven years.

During his employment in Saskatoon he served as a member of the City of Saskatoon Board of Revision and eight years on the City Municipal Planning Commission. He also served as president of the Urban Municipal Administrator's Association of Saskatchewan.

Mr. Sutter is currently a part-time member of the Saskatchewan Municipal Board, serving on its Assessment Appeal Committee. He is also on the Resource Conservation Advisory Committee of the Meewasin Valley Authority.

He holds a Superior Class A certificate as both a rural municipal administrator and urban municipal administrator. He has diplomas in public administration and the advanced course in local government administration, University of Saskatchewan.

Appendix B Terms of Reference

Issue

For a number of decades, obtaining a route for an electrical transmission line in most, if not all, jurisdictions in North America has been difficult. Projects are often controversial, and frequently openly adversarial. The Saskatchewan situation has not always followed this pattern, however there are transmission line projects where routing has been difficult and controversial. Controversies that arise are typically centered on conflicting desires for land use.

SaskPower has a responsibility to provide safe, reliable and cost effective electrical energy to its customers and wants to carry out this responsibility without becoming an adversary of its customers. To assist in accomplishing these goals, SaskPower needs to use optimum processes and guidelines for routing transmission lines.

The processes and guidelines for route selection have been used for the last twenty years. Although they are reviewed at the start of each major project by the Project Team and are part of the submissions reviewed by Saskatchewan Environment and Resource Management (SERM), they have not been reviewed independently of a project. The processes and guidelines are keys to successfully obtaining approved transmission line routes and it is appropriate to ensure they are valid for future projects.

Scope

Therefore SaskPower is establishing a Transmission Line Routing Review Panel to examine current SaskPower processes and guidelines, to engage other groups in the province to obtain their views, to examine those used in other similar North American jurisdictions, formulate recommendations, and report to SaskPower on all findings.

In terms of a transmission line project, the Panel will review those routing related activities taking place between SaskPower internal approval to proceed with a project and the submission to SERM requesting approval to construct on a particular route.

As most transmission lines are constructed in the more highly populated part of the province, the Review will be conducted for that portion of the province south of the Northern Provincial Forest.

Right of Way acquisition and compensation, which take place after SERM approval to construct, will not be included in the review.

Schedule

The Panel is to be established, with members and a chairperson appointed, by 2000 May 01. The Panel's report is to be submitted by 2000 August 31.

The Panel will establish a detailed schedule to meet this deadline.

Liaison

The Panel will be provided with a Technical Liaison from SaskPower's Lines & Stations design department to answer technical questions on transmission line design issues and

to be the main contact at SaskPower for day to day issues. Liaisons will also be provided with Environmental Programs for environmental and public involvement issues and a Communications Liaison to assist in dealing with the media.

Reporting

The Panel will report on progress monthly via the Technical Liaison and present its final report to the Vice Presidents of Corporate Planning & Regulatory Affairs and Transmission & Distribution.

The Final Report, SaskPower's response to the Final Report and supporting material will be made available to the public.

Activities

1. Review of regulatory requirements
2. Review SaskPower's processes and guidelines
3. Benchmarking other utilities
4. Meetings with groups and individuals/review of documents and submissions

Findings/Conclusions/ Recommendations

Appendix C Media Release

Panel to Study Transmission Line Routing

June 22, 2000

Regina...SaskPower is looking to a panel of independent experts and public input to advise the utility on routing guidelines for future transmission line projects in Saskatchewan.

The mandate of the three-member panel is to recommend guidelines and practices that can be applied to the routing of transmission line projects on private and municipal land in the surveyed portion of the province. This will include reviewing SaskPower's existing procedures, studying practices used by other utilities, and obtaining public input from Saskatchewan residents and organizations.

"Members of this review panel were chosen for their widely respected expertise in engineering, environmental science and community planning," said Patricia Youzwa, SaskPower vice-president of Corporate Planning and Regulatory Affairs.

The chair of the Transmission Line Routing Review Panel is Dr. Wayne Clifton, president and CEO of Clifton Associates Ltd. He is joined by Fred Sutter, retired municipal administrator, and Dr. David Gauthier, professor of geography and executive director of the Canadian Plains Research Centre, University of Regina.

Youzwa said SaskPower will not get involved in the panel's work, but looks forward to applying the panel's recommendations to assist SaskPower in the selection of transmission routes in Saskatchewan, including phase 2 of the PA8 transmission line rebuild. She noted no decision will be made on this phase 2 route selection until the panel's work is complete and SaskPower has studied their recommendations.

The Transmission Line Routing Review Panel is scheduled to present their report to SaskPower this fall.

Individuals and organizations wishing to arrange to make a presentation to the Transmission Line Routing Review Panel can contact the panel manager: by phone: (306) 721-0645 in Regina or toll free 1 (877) 547-0333; by fax: (306) 721-8128; by email: routingpanel@sk.sympatico.ca; by web site: www.routingpanel.sk.ca; by mail: 340 Maxwell Crescent, Regina, Saskatchewan, S4N 5Y5.

For more information, call:

Larry Christie
SaskPower
(306) 566-3167 (Regina)
(888) 536-0000 (Toll-free)

Appendix D Panel Activities

Following is a summary of the key activities related to the Panel's activities.

- Contact lists of all potential stakeholders was compiled.
- Contact list of all potential jurisdictions to be benchmarked was compiled.
- Letters from the President of SaskPower to the stakeholders and benchmarking communities was sent. Generic copies of these letters are included as part of this appendix.
- All stakeholders were contacted by phone to solicit input.
- Newspaper advertisements in Saskatchewan's daily and weekly newspapers were published. A copy of the advertisement is included as part of this appendix.
- Meetings were held with stakeholders who requested a meeting(s).
- Representatives from Manitoba Hydro and InterGroup Consultants Ltd. provided a workshop on transmission line routing procedures in Manitoba.
- Meetings were held with the jurisdictions of Alberta, Manitoba, North Dakota and Minnesota to assess transmission line planning and development in those areas.
- Information was obtained to do a "paper search" assessment of transmission routing procedures in Oregon and Colorado.
- Extensive scientific and regulatory documentation was reviewed.

Appendix E Panel Advertisement and Letters of Invitation for Participation

TRANSMISSION LINE ROUTING IN SASKATCHEWAN

WE WANT TO KNOW WHAT YOU THINK.

SaskPower has recently appointed an independent three-member panel to provide advice on routing guidelines for future transmission line projects in Saskatchewan.

The panel's mandate is to provide SaskPower with recommendations on guidelines and practices that can be applied to the routing of transmission line projects on private and municipal land in the surveyed portion of the province. The panel will be reviewing SaskPower's existing guidelines, the guidelines in other jurisdictions and obtaining public input from Saskatchewan residents and organizations.

The panel would like to hear from you.

If you have ideas, comments or concerns about transmission line routing procedures, please let the panel know. The panel will be using public input to assist in developing their recommendations to SaskPower.

Individuals and organizations wishing to arrange to make a presentation, can submit written comments or speak directly to the Transmission Line Routing Review Panel by contacting the panel manager at ***(306) 721-0645 in Regina or toll free at 1-877-547-0333.*** You can also reach the panel by email at routingpanel@sk.sympatico.ca; by website at www.routingpanel.sk.ca; by mail at 340 Maxwell Crescent, Regina, SK, S4N 5Y5; or by fax at (306) 721-8128.

TRANSMISSION LINE ROUTING REVIEW PANEL

BENCHMARKING LETTER

SaskPower *Office of the President*

July 2000

This letter is to let you know that SaskPower is looking to a panel of independent experts and public input to advise the corporation on routing guidelines for future transmission line projects in Saskatchewan.

The mandate of the three-member panel is to recommend guidelines and practices that can be applied to the routing of transmission line projects on private and municipal land in the surveyed portion of the province. This will include reviewing SaskPower's existing procedures, studying practices used by other utilities, and obtaining public input from Saskatchewan residents and organizations.

Members of this review panel were chosen for their widely respected expertise in engineering, environmental science and community planning.

The chair of the Transmission Line Routing Review Panel is Dr. Wayne Clifton, president and CEO of Clifton Associates Ltd. He is joined by Fred Sutter, retired municipal administrator, and Dr. David Gauthier, professor of geography and executive director of the Canadian Plains Research Centre, University of Regina.

The panel manager, Greg Vogelsang, will be contacting you in the near future to discuss the objectives of the panel and to request your assistance in their benchmarking activity. I would like to thank you in advance for your cooperation and, in the meantime, if you would like more information about the panel and their work, you can visit their website at www.routingpanel.sk.ca.

Yours sincerely,

John Wright
President and Chief Executive Officer

2025 Victoria Avenue, Regina, Saskatchewan, S4P 0S1 Fax: 306/566-3523 Tel: 306/566-3103

SaskPower *Office of the President*

PUBLIC CONSULTATION LETTER

July 2000

This is to let you know that SaskPower is looking to a panel of independent experts and public input to advise the corporation on routing guidelines for future transmission line projects in Saskatchewan.

The mandate of the three-member panel is to recommend guidelines and practices that can be applied to the routing of transmission line projects on private and municipal land in the surveyed portion of the province. This will include reviewing SaskPower's existing procedures, studying practices used by other utilities, and obtaining public input from Saskatchewan residents and organizations.

Members of this review panel were chosen for their widely respected expertise in engineering, environmental science and community planning.

The chair of the Transmission Line Routing Review Panel is Dr. Wayne Clifton, president and CEO of Clifton Associates Ltd. He is joined by Fred Sutter, retired municipal administrator, and Dr. David Gauthier, professor of geography and executive director of the Canadian Plains Research Centre, University of Regina.

The panel manager, Greg Vogelsang, will be contacting you in the near future to discuss opportunities for making a presentation to the panel. In the meantime, if you would like more information about the panel and their work, you can visit their website at www.routingpanel.sk.ca.

Yours sincerely,

John Wright
President and Chief Executive Officer

2025 Victoria Avenue, Regina, Saskatchewan, S4P 0S1 Fax: 306/566-3523 Tel: 306/566-3103

Appendix F Contacts

Following is a list of potential stakeholder organizations who were contacted for input to the panel process.

City of Estevan
City of Lloydminster
City of Melfort
City of Melville
City of Moose Jaw
City of North Battleford
City of Prince Albert
City of Regina
City of Saskatoon
City of Swift Current
City of Weyburn
City of Yorkton
Ducks Unlimited Canada
Emma and Christopher Lake Association
Forest Fringe Citizen's Coalition (FFCC)
FSIN, Federation of Saskatchewan Indian Nations
Lakeland Stakeholder Advisory Committee (LSAC)
Meewasin Valley Authority
Nature Saskatchewan
PFRA, Prairie Farm Rehabilitation Administration
Provincial Association of Resort Communities of Saskatchewan (PARCS)
Rural Municipality of Blucher
Rural Municipality of Britannia
Rural Muncipality of Buckland
Rural Municipality of Coalfields
Mural Municipality of Corman Park
Rural Municipality of Dundurn
Rural Municipality of Estevan
Rural Municipality of Hart Butte
Rural Municipality of Lakeland
Rural Municipality of Lumsden
Rural Municipality of Moose Jaw
Rural Municipality of Orkney
Rural Muncipality of Paddockwood
Rural Municipality of Poplar Valley
Rural Municipality of Prince Albert
Rural Municipality of Sherwood
Rural Municipality of Swift Current

Rural Municipality of Vanscoy
Rural Municipality of Wallace
Saskatchewan Agriculture & Food and Saskatchewan Land Bank Commission
Saskatchewan Assessment Management Agency (SAMA)
Saskatchewan Association of Rural Municipalities (SARM)
Saskatchewan Association of Urbal Municipalities (SUMA)
Saskatchewan Chamber of Commerce
Saskatchewan Environment and Resource Management
Saskatchewan Environmental Society
Saskatchewan Highways & Transportation
Saskatchewan Industrial Gas & Power Users Association – SIGPUA,
Saskatchewan Mining Association
Saskatchewan Wildlife Federation
SaskEnergy TransGas Division
SaskTel
SaskPower Corporation
Saskatchewan Outtitters Association
Saskatchewan Stock Growers Association
SaskWater
Tourism Saskatchewan
Transport Canada-Civil Aviation, Prairie & Northern Region, Aerodrome Safety
Village of Christopher Lake
Wakamow Valley Authority
Wascana Centre Authority

The Following Stakeholders provided verbal comments to the Panel

City of Melfort
City of Melville
City of Moose Jaw
City of Regina
City of Saskatoon
City of Weyburn
Emma and Christopher Lake Association
Forest Fringe Citizen's Coalition (FFCC)
FSIN, Federation of Saskatchewan Indian Nations
Lakeland Stakeholder Advisory Committee (LSAC)
Meewasin Valley Authority
Mr. Lyle Bolen
Mr. Tom Day
Mr. Keith Edmonds
Mr. Ken Forbes
Mr. Jack Greening
Mrs. Shirley Haid
Mr. Andy Hannah
Mr. Vern Holland
Mr. Bob Joyce
Mr. Calvin Mills
Mr. Gerald Regnitter
Nature Saskatchewan
Provincial Association of Resort Communities of Saskatchewan (PARCS)
Rural Municipality of Buckland
Rural Municipality of Corman Park

Rural Municipality of Lakeland
Rural Municipality of Lumsden
Rural Municipality of Paddockwood
Rural Municipality of Prince Albert
Rural Municipality of Sherwood
Rural Municipality of Vanscoy
Saskatchewan Agriculture & Food and Saskatchewan Land Bank Commission
Saskatchewan Association of Rural Municipalities (SARM)
Saskatchewan Association of Urban Municipalities (SUMA)
Saskatchewan Chamber of Commerce
Saskatchewan Environment and Resource Management
Saskatchewan Environmental Society
Saskatchewan Highways & Transportation
Saskatchewan Wildlife Federation
SaskTel
SaskPower Corporation
Tourism Saskatchewan
Transport Canada-Civil Aviation, Prairie & Northern Region, Aerodrome Safety
Village of Christopher Lake
Wakamow Valley Authority
Wascana Centre Authority

Meetings were held with the following stakeholders and individuals:

Name	Representing	Date
Mr. Gary Belanger Mr. Bob Cooper Ms. Margot Dynna Mr. Jonathon Kalmakoff Mr. Dave McDonald Mr. Don Nagel Mr. Ian Yeates	SaskPower Corporation	April 11, 2000
Mr. Bernie Bolen	SaskPower Corporation	July 12, 2000
	Forest Fringe Citizens Coalition	September 14, 2000
Calvin Mills, Councillor,	Rural Municipality of Maryfield	September 25, 2000
Marshall McLeod, Councillor	Rural Municipality of Moosomin	September 25, 2000
Keith Smith, Councillor	Rural Municipality of Martin	September 25, 2000
George Crawford, Reeve	Rural Municipality of Rocanville	September 25, 2000
Mr. Ralph Leibel	Saskatchewan Municipal Affairs	September 25, 2000
Mr. Randy Seguin Mr. Henry Desjarlais	Saskatchewan Environment and Resource Management	September 26, 2001
Mr. John Nanson	Saskatchewan Municipal Affairs	September 29, 2000
Ms. Laura Hartney	Rural Municipality of Corman Park	September 29, 2000
Mr. Jon Wyatt Mr. Paul Hunt Mr. Tim Sinnet	Saskatchewan Highways and Transportation	September 26, 2000

Mr. Bernie Bolen Mr. Larry Christie Mr. Bob Cooper Mr. Bruce Martin Mr. Dave McDonald Mr. Don Nagel	SaskPower Corporation	October 12, 2000
Mr. John Gerstmar	Meewasin Valley Authority	October 13, 2000
Mr. Lyle Bolen	Private Citizen	October 13, 2000
Mr. Rick Howse	City of Saskatoon	October 13, 2000
Ms Ann Coxworth Mr. Bert Weichel	Saskatchewan Environmental Society	October 13, 2000
Mr. Ken Engel	Saskatchewan Association of Rural Municipalities	October 23, 2000
Mr. Roy Anderson Mr. Ian McGilp	Tourism Saskatchewan	October 27, 2000
Mr. Roy Anderson Ms. Bonnie Baird Mr. Ian McGilp Mr. Stephen Pearce	Tourism Saskatchewan	November 15, 2000

Meetings were held with the following individuals as part of the benchmarking activities

Name	Organization	Date
Mr. Dennis DePape Mr. Cam Osler	InterGroup Consultants	July 31, 2000
Mr. Wade Monroe	Manitoba Hydro	July 31, 2000
Mr. Bernie Bolen Mr. Bob Cooper Ms. Margot Dynna Mr. Dave McDonald Mr. Stan Saylor Mr. Robert Stedwill Mr. Neil Thompson Mr. Roy Yeske	SaskPower Corporation	August 10, 2000
Mr. Wayne Berg	Alberta Energy Utilities Board	September 8, 2000
Mr. Dean Chesterman	E.S.B.I. Alberta Ltd.	September 8, 2000
Mr. Jack Holt Mr. Gaylord Johnson Mr. Scott Lang	Basin Electric Power Cooperative	October 17, 2000
David Johnson. Bob Lindholm Dick Nichols Cary Weber	Minnesota Power	October 18, 2000

The following individual and stakeholder groups provided written submissions in the form of letters, e-mail transmittals and formal presentation documents to the Panel

Name	Organization	Submission Date
Mr. Gerald Regnitter	Forest Fringe Citizens Coalition	July 20, 2000 August 10, 2000
Mr. Louise Hebert Lafontaine	Citizen	August 15, 2000
Mr. Bradley Muir and Ms. Susan Carr	Forest Fringe Citizens Coalition	August 16, 2000
Cherie and Arlan Frick	Private Citizens	August 21, 2000
Mr. Gerald Regnitter	Forest Fringe Citizens Coalition	August 22, 2000
Mr. Bob Wills	Wakamow Valley	September 26, 2000
Mr. Gerald Regnitter	Forest Fringe Citizens Coalition	September 6, 2000
	SaskPower Corporation	September 6, 2000
	Forest Fringe Citizens Coalition	September 14, 2000
Ms. Anne Cox	Private Citizen	September 14, 2000
Mr. David Quiring	Private Citizen	September 14, 2000
Mary and Bill Squire	Private Citizens	September 14, 2000
Sister Joan Baron	Franciscan Forest Sanctuary Christopher Lake	September 14, 2000
Mr. Don Cox	R.M. of Paddockwood	September 14, 2000
Mr. Frank Switzer	Nature Saskatchewan	October 3, 2000
Mr. Lorne Scott	Saskatchewan Wildlife Federation	October 3, 2000
Mr. Greg Hoffort	Rural Municipality of Estevan	October 5, 2000
Mr. Rick Howse	City of Saskatoon	October 13, 2000
Mr. Casey Davis	Saskatchewan Chamber Of Commerce	October 25, 2000
	SaskPower Corporation	January 10, 2001

Appendix G SERM Guidelines for Environmental Protection from the Development of Electrical Transmission Lines

Environmental Assessment Branch
Saskatchewan Environment and Resource Management

February 1980

Revised, September 1993

Table of Contents

1.0 INTRODUCTION 1

2.0 PRELIMINARY ROUTE SELECTION AND SURVEY 1

- 2.1 General: 1
- 2.2 Concerns Related to Watercourses and Other Sensitive Terrain. 1
- 2.3 Vegetation and Wildlife Concerns 3
- 2.4 Heritage Resource Concerns 4
- 2.5 Concerns Relating to Agriculture and Other Land Uses 6
- 2.6 Recreation, Tourism and Aesthetic 7
- 2.7 Survey Constraints 8

3.0 SCHEDULING, DESIGN AND CONSTRUCTION 9

- 3.1 Scheduling. 9
- 3.2 Right-of-Way Clearing 10
- 3.3 Disposal of Slash 10
- 3.4 Other Construction Activities. 11
- 3.5 Special Construction and Design Considerations 12
- 3.6 Construction Contracts and Surveillance 14

4.0 MAINTENANCE AND ABANDONMENT 15

- 4.1 Right-of-Way 15
- 4.2 Abandonment 16

APPENDIX: GLOSSARY OF DEFINITIONS 17

1.0 INTRODUCTION

1.1 Objective: These guidelines present a practical approach to environmental protection of surrounding lands during the development of electrical transmission lines. Their purpose is to assist in the mitigation of the impact of electrical energy transmission line development on the physical, biological and human environment of Saskatchewan.

1.2 Procedures: These guidelines apply to all types of electrical energy transmission line developments, electrical substations, and other auxiliary facilities. These guidelines are to be administered by Saskatchewan Environment and Resource Management as the principal approving agency. Adherence to these guidelines does not obviate the need to comply with other guidelines, legislation, or terms and conditions of environmental approval as may be required on a specific case by case basis.

These guidelines cover the general steps in electrical transmission line development including route selection and survey, scheduling, design and construction, and maintenance and abandonment. It should be noted that not all guidelines apply to every situation. A practical, environmentally conscious approach should be taken during electrical transmission line development.

1.3 Definitions: A glossary of definitions is outlined in Appendix A.

2.0 PRELIMINARY ROUTE SELECTION AND SURVEY

2.1 General:

2.1.1) An inter-disciplinary approach should be adopted at the preliminary route selection stage, incorporating analysis from a diverse range of environmental, socio-economic and engineering specialists.

2.1.2) Considerations should be given to alternative routes for right-of-way selection.

2.1.3) Routes of electrical transmission lines should be selected to maximize the use of existing roads for access and to minimize construction of new access roads. Existing corridors should be considered for route selection wherever possible providing no other significant environmental impacts are likely to result (e.g. conflict with scenic routes).

2.1.4) Local land occupant and municipalities should oe consulted during the preliminary route selection.

2.1.5) Consultation with the Indian and Metis Affairs Secretariat should occur early in the planning process when the proposed transmission line intends to cross land under selection for treaty land entitlement, land under specific claim and currently designated indian reservations.

2.2 Concerns Related to Watercourses and Other Sensitive Terrain.

2.2.1) The following reservations of undisturbed vegetation are recommended between the right-of-way and the edge of a watercourse, except at watercourse crossings:

i) class II watercourses with actual or potential value for supporting fish on a yearound basis require a reservation of 90m. (see Glossary for definitions of watercourse classification);

ii) class II watercourses not capable of supporting fish on a seasonal basis require a reservation of 30m;

iii) small ponds, sloughs and Class I watercourses in natural (uncultivated) areas require a reservation of 15m.

Consultation with the Fisheries Branch of SERM should take place to determine exact requirements of specific areas. It should be noted that some municipal zoning bylaws have more stringent requirements.

2.2.2) Routes should be considered which:

i) avoid crossing watercourses wherever possible;

ii) avoid encroachment on a watercourse or flood plain, except at selected crossings;

ii) represent the corridor alternative offering the least total number of watercourse crossings and/or the least number of major crossings;

2.2.3) When crossings cannot be avoided, routes should cross watercourses:

i) which are already subject to natural siltation;

ii) where the channel is straight, unobstructed and well defined (to minimize alteration of the watercourse channel during construction);

iii) following an existing corridor, if one exists, to avoid disturbing the banks and channel more than once;

iv) when crossings must occur, the reservations identified in Section 2.2.1 should be maintained where hand clearing of vegetation occurs.

v) perpendicular to watercourses if possible.

vi) all areas within the stream valley which are disturbed should be recontoured and revegetated upon completion of the project in order to minimize erosion.

2.2.4) A right-of-way should avoid paralleling Class II watercourses. If paralleling cannot be avoided, consideration should be given to locating the right-of-way on the side of the watercourse with the least number of major tributaries. Consideration should also be given to the reservations recommended in 2.2.1 and 2.6.3.

2.2.5) Investigations of land instability should be made, and unstable areas and steep gradients should be avoided wherever possible.

2.2.6) Sensitive terrain such as wetlands, areas of intermittent permafrost and sand hills should be avoided.

2.2.7) If wetlands cannot be avoided, rights-of-way should be chosen which follow high ground or where effective control of drainage can be maintained, providing that no other significant environmental impacts are likely to result (e.g., conflict with forestry or wildlife concerns).

2.2.8) Areas which should be avoided in permafrost zones are:

i) Permafrost slopes over 7 per cent;

ii) All watercourses;

iii) Burn areas which have a temporarily lowered frost table which can cause instability later;

2.2.9) When sand hill areas must be crossed, rights-of-way should be chosen where the terrain is as flat as possible.

2.3 Vegetation and Wildlife Concerns

2.3.1) When selecting a route, the following areas should be avoided wherever possible:

i) Known critical wildlife and/or environmentally sensitive areas (e.g. IBP areas);

ii) Specially designated areas which may be considered environmentally sensitive. Such areas may include:

- ecological reserves
- Critical Wildlife Habitat Protection Act lands
- federal bird sanctuaries
- game preserves
- protected areas
- wildlife refuges
- heritage marshes
- waterfowl production areas
- wildlife management units
- fish and wildlife development fund land

(see Glossary for definitions)

iii) Other areas likely to provide good wildlife habitat, such as:

- major wetlands;
- areas designated as critical wildlife habitat as defined on the Terrestrial Habitat Inventory Maps;
- south-facing slopes, flood plains, and river and creek edges;
- sand dune and sand hill areas.

iv) Highly productive and/or unique forested areas, including:

- areas designated by the Canada Land Inventory as Class 1-4 for forestry (see glossary for definition).
- isolated areas of climax forest.
- reforestation and nursery areas.

v) Scattered fragments of critical wildlife habitat within extensively cultivated agricultural areas and wetlands.

2.4 Heritage Resource Concerns

2.4.1) Heritage Resources, including archaeological and paleontological sites are fragile, inconspicuous components of the landscape, and frequently buried below surface.

2.4.2) Archaeological sites are locations containing the material evidence or remains of past human activity. Paleontological sites are locations containing the fossils of extinct

vertebrate animals, including their mineralized skeletal remains and traces of activity, or the macroscopic fossils of invertebrate animals and plants.

2.4.3) In the northern (forested) region of Saskatchewan significant archaeological and historic sites have high to moderate probability of being located in proximity or adjacent to:

i) previously recorded heritage sites.

ii) lakes greater than 5 km in length/width, particularly near inlets, islands, narrows or other shoreline constrictions, peninsulas and other prominent points on land, and sandy beaches;

iii) in proximity to and along navigable streams and seasonal steams in well-formed valleys, particularly on or near falls and rapids, confluences with other streams, relict terraces, and portage routes; and

iv) in association with prominent landforms, prominent uplands with well drained soils, and the upland margins of low lying areas, such as kames, eskers and moraines.

2.4.4) In southern Saskatchewan, including parkland habitats, significant archaeological and historic sites have high to moderate probability of being located in proximity or adjacent, to;

i) previously recorded archaeological sites;

ii) permanent lakes greater than 2 km in length/width;

iii) seasonal lakes greater than 2 km in length/width, if located in well-defined basins;

iv) permanent rivers/streams;

v) Seasonal streams in well-formed channels or valleys;

vi) sand-dune complexes, particularly if associated with any of the above noted terrain types;

vii) uplands, escarpments or other prominent features such as kames, eskers and moraines; and

viii) Humucky moraines associated with sloughs;

ix) glacial lake strand lines.

2.4.5) Vertebrate and invertebrate fossils may be found in a number of localities in Saskatchewan, including northern regions. In particular, fossil-bearing deposits may be encountered in:

i) plateaus and badlands;

ii) in walls of valleys that have erosional cuts below surficial deposits; and

iii) other contexts containing exposed Palaeozoic or later strata.

2.4.6) Adverse impacts to heritage resources, if situated in development areas, may occur as a consequence of:

i) tower/structure and guy-wire placement;

ii) ploughed-in underground cables;

iii) access roads and trails (including those of temporary usage);

iv) heavy vehicular traffic (particularly during warm weather);

v) substations and swithcing stations;

vi) tree and brush removal, if not done by hand; and

vii) temporary facilities associated with construction such as work camps, staging areas and barge-off loading sited.

2.4.7) Heritage Resource Impact Assessment (HRIA), pursuant to section 63 of The Heritage Property Act, may be warranted for electrical transmission projects in the above-noted environmental contexts and in proximity to previously recorded sites. Electrical transmission projects should be reviewed by Arcaheogical Resource Management, Heritage Branch- Saskatchewan Municipal Government to determine need for, and level of, HRIA. The HRIA serves to:

i) Determine if heritage sites are present within construction rights-of-way;

ii) Facilitate or assist site avoidance vis-a-vis minor right of way changes or project relocation/redesign.

iii) Evaluate sites found in unavoidable conflict with development;

iv) and formulate recommendations for managing adverse impacts.

HRIA studies must be carried out and completed prior to construction. If necessary, mitigation may involve site avoidance, physical protection (e.g., fencing) salvage excavation, monitoring, or a combination of these measures. HRIA's must be conducted by qualified personnel under an investigation permit from Saskatchewan Municipal Government (pursuant to section 67 of the Heritage Property Act).

2.4.8) Sites of a Special Nature (SSN's), including burials, pictographs, petroglyphs, boulder effigies and medicine wheels and other ceremonial sites may be encountered during the course of development. No person shall remove, excavate or alter SSN's in any manner whatsoever except as authorized by the Minister responsible for Municipal Government.

2.5 Concerns Relating to Agriculture and Other Land Uses

2.5.1) Electrical transmission lines should cross on lands already modified by human activity so as to avoid any further disturbance of natural habitat where practical.

2.5.2) Line routing shall take into consideration horizontal and vertical clearance requirements as set out in Canadian Standards Association standard C22.3 No. 1M87 (or latest). SPC guidelines (EGI-1961) have also been developed as a guide for the purpose of providing adequate clearances (equal to or greater than CSA minimum values) from new transmission guidelines to habitable dwellings, other buildings, farmyard shelter belts and special working areas.

2.5.3) Route selection should avoid, where reasonable, those areas identified as lands with existing use (or high potential use) of irrigation farming methods.

2.5.4) When selecting a route in northern Saskatchewan, consideration should be given to avoiding traditional land use areas.

2.5.5) In cultivated agricultural areas, transmission line routes should be considered which parallel crop boundaries wherever it is technically and economically feasible to do so.

2.5.6) When selecting a route in agricultural areas, attempts should be made to limit inconvenience to local landowners, but not at the expense of critical wildlife and other environmentally sensitive areas. In cultivated areas, transmission line structures should be located on fencelines, croplines, field windbreaks, at the edge of poorly drained areas and bluffs of trees, strips of unbroken land, and on the edge of road allowances in order to reduce interference with farm machinery operation. When this is not feasible, a 30m reservation should be provided between any of the above obstacles and the nearest pole or anchor of the structure to allow farm machinery to pass.

2.5.7) Consultations with the locally affected public should be held prior to finalization of route alternatives and final route selection.

2.6 Recreation, Tourism and Aesthetic

2.6.1) When selecting a route, consideration should be given to avoiding officially designated and/or traditionally used private and public recreation areas, including:

i) resorts including cottage subdivisions;

ii) provincial parks;

iii) protected areas;

iv) national parks including ecological reserves;

v) regional parks;

vi) historic parks and sites;

vii) recreation and picnic sites;

viii) recreational watercourses and beaches including major canoe routes and scenic areas such as rapids and waterfalls; and

ix) private and public campgrounds.

2.6.2) When selecting a route, consideration should also be given to avoiding the following:

i) areas with a high recreational capability, such as areas designated by the Canada Land Inventory as Class 1-3 for recreation (see Glossary for definition); and

ii) intrusion into wilderness and/or environmentally sensitive areas- as per concerns listed in 2.2, 2.3, and 2.4 above.

2.6.3) If transmission lines must be located within or near officially designated and/or traditionally used private and public recreation areas, the following distances are recommended between the edge of rights-of-way and the boundary of areas listed under 2.6.1 in order to buffer the aesthetic impact.

i) 450m in non-forested and/or relatively flat terrain.

ii) 200m in heavily forested and/or rolling terrain where there is a naturally occurring visual screen.

2.6.4) If electrical transmission lines must cross any officially designated and/or traditionally used linear recreation routes (e.g., canoe routes, ski trails, etc.) they should cross as close as possible to right angles. Special considerations for crossing include:

i) routes should cross at a tangent to circular routes (as opposed to bisecting them); or

ii) at the beginning or end of such routes.

2.6.5) Existing and potentially sensitive viewpoints should be identified during preliminary route selection and avoided wherever possible.

2.6.6) When significant viewpoints cannot be avoided, rights-of-way should be located beyond 1 kilometre of the viewpoint, so that the visual impact can be reduced.

2.6.7) Electrical transmission lines should avoid paralleling scenic access roads to private or public recreation areas and major tourist routes.Where transmission lines must cross such scenic routes, they should cross as close as possible to right angles.

2.7 Survey Constraints

2.7.1) Extensive use of maps and aerial photography should be made in preference to any ground disturbance at the site survey stage. Once corridor selection is complete, site specific environmental information with ground surveys may be used.

2.7.2) Authorization must be obtained to enter private and public lands to perform site surveys.

2.7.3) Maximum use should be made of existing roads and trails for survey purposes. Where temporary access is required for survey because reasonable access is not otherwise possible, and if these trails are of no use as a permanent access after construction, these trails should be blocked by brush piles or fences after survey and construction is complete.

2.7.4) In heavily forested areas, survey cut lines should be limited to a 2m swath if heavy vehicles not required. Where practical, ATV's may be used in such instances.

2.7.5) In cultivated areas, field survey crews should use offsets wherever possible to avoid putting a cut line through shelter belts.

2.7.6) In wetlands and permafrost areas, survey cut lines should be cleared during the winter, and only if there is adequate snow cover to protect the vegetation mat and the soil is frozen to a sufficient depth to support heavy equipment. In summer, survey vehicles should be restricted in these areas to terrain that is not susceptible to erosion. Where this is not possible, helicopters or other approved transportation equipment should be used.

3.0 SCHEDULING, DESIGN AND CONSTRUCTION

3.1 Scheduling.

3.1.1) Construction should be done during late fall and winter months whenever possible. Operations should also be scheduled to avoid critical periods of disturbance to natural vegetation and sensitive fish and wildlife populations. Critical periods generally are:

i) for identified raptor habitat (i.e., most bird of prey):

- Northern regions: May 1-June 30.

- Southern Regions: March 15- June 30.

ii) for identified colonial bird habitat (i.e., colonies of terns, gulls, herons, cormorants, etc.):

- All through the breeding cycle, i.e., from ice break-up to July 15.

iii) for identified big game and upland game bird habitat:

- January 1- May 15.

- Very high sensitivity from late February to late March for big game.

iv) for identified important fish habitat (i.e., where potential spawning areas must be crossed):

- April 15- June 1 for spring spawners.

- September 15- November 1 for fall spawners.

The following points should be followed when fish habitat is altered:

- Fish Habitat Alteration Permits (FHAP) must be issued for developments at sites affecting fish habitat.

- FHAP's must be issued for stock waters or waters supporting fish that are affected.

- on site inspections must be conducted by District Conservation Officers or the Regional Fisheries Biologist prior to and after alterations.

- tributaries or drainage areas that feed fish supporting waters must have proper erosion control implemented should alterations occur on or along these water courses.

- all alterations must follow the guidelines presented by the Regional Fisheries Biologist and Federal Fisheries Act as stated within the permit.

- permits must have expiration dates designated by discretion of the Regional Fisheries Biologist or Conservation Officer, and they must be renewed prior to further developments at the site.

3.1.2) Construction should be scheduled to allow adequate lead-time for heritage resource impact assessment and mitigation. HRIA field investigations must be conducted in the absence of snow cover and ground frost. In southern Saskatchewan, HRIA's are normally conducted between mid-April and late October. In northern Saskatchewan, HRIA's are carried out between mid-May and early October.

3.2 Right-of-Way Clearing

3.2.1) Right-of-way clearing widths should be kept to a minimum. Clearing width should be determined by required need and environmental sensitivity. Brush clearing in heavily forested areas should be assisted by flagging each edge of the right-of-way for clearing control.

3.2.2) Loss of natural vegetation during clearing operations should be minimized and the organic mat should be preserved as much as possible. Clearing of brush should only be done when required to maintain an adequate conductor safety clearance of not less than 4.5m above the brush. In areas of low shrub growth, no clearing should be required, except as may be required for necessary access.

3.2.3) Timber or other vegetation outside of the right-of-way clearing boundary should not be cut or otherwise damaged unless necessary to selectively remove very tall trees that would endanger operation by falling onto the conductor.

3.2.4) Where electrical transmission lines must cross shelter belts, clearing should be limited to the selective cutting of trees which might contact the conductor. If a structure must be placed inside a shelter belt, clearing should be kept to a minimum.

3.2.5) Clearing operations should be discontinued at the outer edge of watercourse reservations (as outlined in Section 2.1.1). If large brush or timber must be removed within watercourse reservations, trees should be felled away from the watercourse and carefully removed to minimize any sediment transport and/or soil erosion. Hand cutting in these reservations is the preferred method.

3.3 Disposal of Slash

3.3.1) In forested areas, all merchantable timber occupying the right-of-way should be salvaged if practical. A Timber Permit is required for the removal of Crown timber from provincial lands. Merchantability and salvage requirements are to be determined by the Regional Forester of Saskatchewan Environment and Resource Management.

3.3.2) Waste material from forest clearing should not be disposed of outside the right-of-way. If burned, such disposal must comply with the appropriate requirements of The Prairie and Forest Fires Act including burning permit requirements

3.3.3) If cut timber and brush are not burned, they should be placed in windrows at the side of the right-of-way or in clearings. In forested areas windrows or debris piles should be at least 4.5m from standing timber.

3.3.4) Windrows should be compacted by running heavy equipment over them.

3.3.5) A 6.5m break in the windrows should be made at least every 100m (to allow for lat-

eral drainage and animal access). Alternatively, the windrows should be placed on alternating sides of the right-of-way at 100m intervals.

3.3.6) If cleared material is chipped, chipped wood must not be disposed of where it will be washed or submerged in standing water.

3.3.7) In erosion-sensitive terrain, debris should be compacted and placed in the right-of-way across the direction of water runoff in order to prevent erosion.

3.3.8) Cut timber and brush must be dealt with in consultation with the land occupant. Trees, brush, stumps and earth shall not be piled on or left overhanging property beyond the right-of-way; road allowances; private roads and trails; telephone, telegraph, pipeline, highway, railroad and existing powerlines right-of-way; cultivated lands; dugouts and creeks; hedges; fences; shelterbelts; gardens; lawns; graveyards; machinery; buildings; wells; drainage or irrigation channels; or anything which may interfere with the farming, ranching, logging, or other operations of the land occupant from which the electrical transmission line right-of-way has been obtained.

3.3.9) Debris disposal on Provincial Forest lands is governed by The Forest Act.

3.4 Other Construction Activities.

3.4.1) In areas requiring removal of large standing timber, stumps should not be grubbed within 2m of standing timber at the edge of the right-of-way. During grubbing, damage to trees or hedgerows by earth fill around tree trunks, exposure of tree trunks, compaction of soil over tree roots, or removal of bark should be avoided.

3.4.2) The extent of exposed soils should be kept at a minimum at all times.

3.4.3) Equipment should be kept on the right-of-way as much as possible.

3.4.4) Construction machinery should not work near a watercourse unless absolutely necessary. A Fish Habitat Alteration Permit may be required for work around a watercourse.

3.4.5) All fences that are damaged or removed must be rebuilt after electrical transmission line construction. Temporary fencing arrangements should be made with the land occupant during the construction phase if livestock is a problem and the occupant so desires.

3.4.6) In the course of construction, uncovered archaeological remains must be reported to Archaeological Resource Management, Heritage Branch- Saskatchewan Municipal Government as soon as possible. Construction in the affected area must cease until a formal review is completed. Collecting archaeological artifacts, including arrowheads, knives or other stone tools without a permit is prohibited.

3.4.7) Construction camps should be located in accordance with Saskatchewan Labour and guidelines for the establishment and operation of temporary work camps.

3.4.8) A contingency plan should be prepared for the detection and suppression of fires that are related to or that may affect the construction of the electrical transmission line development. This plan should be submitted to the appropriate approving agency

prior to construction. The plan must be for the construction site and for the work camp. Fire suppression equipment must be on hand during the burning permit season as per the Prairie and Forest Fires Act.

3.5 Special Construction and Design Considerations

3.5.1) In muskeg and permafrost areas, work should be done as much as possible in the winter and the organic mat should be preserved. Where necessary the organic mat should be protected to prevent tearing and ripping. No bulldozing, ditching or scalping of the surface or subsurface should be made unless the insulating cover is restored to prevent melting.

3.5.2) Where other erosion hazard zones will be created, assessment of the degree of erosion likely to occur is required. Erosion control measures must be appropriate to the site conditions and as effective as possible. The various possible control measures are listed below in order of diminishing effectiveness.

For slopes less than 5%:

i) prevention of surface erosion

- crushed rock or gravel
- scarification
- soil and stone dykes
- ditches
- terraces and reverse benches

ii) prevention of sediment transport from the site

- crushed rock or gravel
- buffer strip
- sediment traps.

For steep slopes (greater than 5% slope):

Complete stabilization is best (e.g., rigid structures).

i) prevention of surface erosion

- rigid armouring of surface
- tracking
- serrations
- soil and stone dykes

- ditches

- terraces or reverse benches

ii) prevention of sediment transport from site

- rigid amouring

- mechanical stabilization (e.g., compaction)

- buffer strips.

3.5.3) Where erosion of fine topsoils may become a problem in southern agricultural areas, steep slopes should be avoided. Also, the amount and speed of traffic or heavy equipment in these areas of fine topsoil should be regulated to minimize pulverizing the soil surface.

3.5.4) Complete spans should be used for transmission lines crossing narrow stream valleys or gullies. Placement of structures on the banks or slopes of valleys must be minimized.

3.5.5) Structure design should conform to proven safety designs which minimize the electrocution of perching birds.

3.5.6) New road access during construction should be kept to a minimum, and all temporary access roads and watercourse crossings must be abandoned and blocked off to the satisfaction of the approving agency using approved methods when they are no longer needed.

3.5.7) Where necessary, guy wire markers should be installed to reduce the possibility of animal collisions.

3.5.8) Where aerial spraying or seeding is carried out, special circumstances may occur where guy wires or conductors are not readily visible to an airplane pilot. Consideration should be given to marking these guys or conductors to make them more visible.

3.5.9) In order to minimize aesthetic impacts in scenic recreation areas, the following construction practices and design should be considered:

i) Use of wooden pole structures rather than steel structures where transmission towers are silhouetted against the skyline.

ii) Placement of pole structures approximately 2/3 of the way up the slope, where slopes must be crossed.

3.6 Construction Contracts and Surveillance

3.6.1) The construction contract should be explicit in describing necessary environmental protection measures. These specifications should be adhered to by all construction personnel.

3.6.2) Construction activities should be monitored on a regular and frequent basis, and

modification and corrective measures implemented where necessary. Under the Environmental Approval for the project, an environmental monitor may be required.

3.6.3) Post-construction environmental surveillance should be conducted within one-year after development to assess the effectiveness of mitigation measures. Surveillance should then be carried out every 5 years. Mitigation should be continued until successful.

4.0 MAINTENANCE AND ABANDONMENT

4.1 Right-of-Way

4.1.1) Right-of-way maintenance should be kept to a practical minimum. In natural areas, the regrowth of understorey woody and herbaceous vegetation should be encouraged to provide nesting sited, food and cover for wildlife.

4.1.2) Ground inspections of electrical transmission lines should be made during the non-growing seasons. Where ground inspection must be conducted during growing seasons, special equipment should be used to reduce damage to crops and natural vegetation. In wetland and muskeg areas maintenance inspections should be scheduled when the ground is frozen.

4.1.3) Maintenance inspection should be done through utilization of the right-of-way as the access route wherever feasible, and access restrictions should be instituted where necessary.

4.1.4) Gates should be installed at all existing fence crossings. These should be kept closed during and after electrical transmission line construction and locked, under special circumstances, at the land occupant's request.

4.1.5) Although mechanical brush control is the preferred method for subsequent control after initial clearing, a herbicide (pelt or spray) may be used for further control provided its application meets the standards of the approving agency.

4.1.6) Herbicides to be used for soil stabilization around poles and for brush control (pellets or spray) should be selected to ensure that they:

i) are non-toxic to man and animals (including fish) at the applied dose.

ii) do not contain sodium chloride compounds. Herbicides for soil sterilization or brush control should not be used within the root zone of any planted hedgerows or near farm shelterbelts.

iii) benefit the environment more than harm it. The corrosiveness and volatility of a herbicide must be considered before application. The land occupant or governing agency of the land should be consulted prior to application.

4.1.7) Soil sterilization should not be done in pasture or grasslands. Herbicide application for soil sterilization should proceed only after consultation with the land occupant.

4.1.8) Consideration should be given to the installation of sheet metal guards around the poles rather than soil sterilization to provide fire protection where such protection is required.

4.1.9) A reservation of 25 m should be provided between chemical application for brush control and the edge of Class 1 or 2 watercourses, the remaining portion to be cleared preferably by hand.

4.1.10) Postpone mechanical cutting or spraying of rights-of-way until late summer (after August 1) to avoid nesting and young birds.

4.1.11) Maintenance people should use wide-track, soft-tired vehicles when patrolling sand dunes and other erosion-sensitive, fine topsoil areas.

4.1.12) The mitigation measures for design and construction should be adhered to when repairing and maintaining any facilities.

4.1.13) During emergencies, access to the right-of-way will be required immediately by maintenance people. This may cause some disruption to wildlife and damage should be kept to a minimum. Restoration of the damaged environment, where feasible, should be carried out at an appropriate time as outlined in the guidelines to avoid further disruption and damage.

4.2 Abandonment

4.2.1) All electrical transmission line developments should be abandoned in such a manner that the forest, wildlife, and/or agricultural productivity is restored to the satisfaction of the approving agency.

4.2.2) In northern forested areas, where access roads and/or electrical transmission lines are no longer needed, consultations should be held with the appropriate approving agency in order to determine the most suitable manner in which access to the right-of-way can be decommissioned.

4.2.3) All conductors should be salvaged. However, where appropriate, abandoned poles and towers should be left to create nesting sites for raptors.

4.2.4) Where abandoned rights-of-way are suitable for recreational purposes, all structures should be completely removed.

4.2.5) All temporary facilities, waste construction materials, damaged or abandoned conductors, electrical transformers and other equipment should be removed and disposed in a manner acceptable to the approving agency.

APPENDIX: GLOSSARY OF DEFINITIONS

Approving Agency:

The agency responsible for approving various aspects of construction activity. Approval-in-principle to proceed with electrical transmission line developments must be obtained from the Environmental Assessment Branch, Saskatchewan Environment and Resource Management. Other specific branches and agencies requiring approval may be:

i) Forestry Branch - Saskatchewan Environment and Resource Management. (e.g., forestry legislation and policy concerning right-of-way construction, salvage, debris disposal and timber reservations.)

ii) Fisheries Branch- Saskatchewan Environment and Resource Management. (Fish Habitat Alteration Permits are required for temporary or permanent crossings of all Class II streams, and may be obtained from Regional Fisheries Biologists.

iii) Lands and Regulatory Management Branch- Saskatchewan Agriculture and Food. (e.g. provincial lands regulations, site restoration consultation)

iv) Regional Public Health Offices, Saskatchewan Health (e.g. public health regulations, sanitation health regulations)

v) Saskatchewan Highways and Transportation.

vi) Community Planning and Development Services (southern areas) and Northern Development Services (north Saskatchewan), Saskatchewan Municipal Government. (e.g. subdivision regulations).

vii) Archaeological Resource Management, Heritage Branch- Saskatchewan Municipal Government. (e.g. HRIA Mitigation, investigation permitting). In addition to those agencies listed above, further background information and guidance is also available from various provincial agencies without a specific regulatory approval function with respect to electrical transmission line development. The following authorities should be consulted for advice, wherever applicable:

- Tourism Division- Saskatchewan Economic Development.
- Local rural municipalities.
- Saskatchewan Water Corporation.

Canada Land Inventory (CLI)

A comprehensive survey of land capability and use for various purposes. It includes assessments of land capability for agriculture, forestry, recreation and wildlife; information on present land use; and assessments of social and economic factors relative to land use. The CLI was undertaken as a co-operative federal-provincial program administered under the federal Agricultural Rehabilitation and Development Act (ARDA) of June 1961.

The classification is intended to function as a rating system and is designed to be interpreted from a variety of basic information. Various categories of agriculture, forestry, recreation

and wildlife lands are classified in one of seven based on inherent productivity. Extremes are represented by Class 1 (the best lands), while those in Class 7 have the very lowest productive capability.

Climax Community:

The final or stable community in a successional series of changing species composition in an ecosystem. It represents a self-perpetuating, mature group of various plant populations in equilibrium with the physical habitat.

Critical Wildlife Habitat and Critical Wildlife Periods:

That habitat and those periods in which and during which disturbance of wildlife may result in adverse impacts that threaten the continued existence of the affected populations of wildlife in a local area. Critical Wildlife Habitat Crown Lands are designated in the Critical Wildlife Habitat Protection Act.

Critical Wildlife Areas maps are currently available from the Wildlife Branch of Saskatchewan Environment and Resource Management. This information is presented on 1: 250000 map sheets. Mapping deals with all upland birds, big game species and important non-game species (on a regional or provincial basis). Information on waterfowl nesting and staging areas are covered by the Canada Land Inventory for Waterfowl and Ducks Unlimited.

Electrical Energy Transmission Lines:

A combination of various materials to form structures which will support electrically conductive wires (i.e., conductors) including those wires and an insulating medium between structure and wires assembled to from a high voltage connection (usually 138 kV and higher) between electrical switching stations for the purpose of:

i) transmitting large amounts of electrical energy within the province; and/or

ii) Transmitting large amounts of electrical energy between major electrical utilities.

Erosion Potential Zones or Susceptibility to Erosion:

High	All slopes in excess of 10% and gravelly sandy to fine sandy loam soils.
Medium	Gravelly sand or silt loam soil soils and areas with slopes in excess of 2.5 %.
Low	Other soils with finer texture and flat topography.

Any exposed bare soil without a protection cover of vegetation (e.g., unconsolidated sand dunes) is also extremely susceptible to erosion, especially when it occurs on a sloping surface.

Existing Corridor:

A previously developed linear right-of-way such as highways, railways, pipelines, electrical transmission, and any other similar linear development.

Fish:

Means fish as defined in the Fisheries Act, RSC 1970 c.F-10.

Land Occupant:

One who occupies, resides on, or earns income from land to be utilized as a right-of-way for electrical transmission line development.

Natural Vegetation:

Any complex of native plant species which exist in their environment without man's assistance.

Permafrost Zones:

Zones in which the layer of soil or rock in which the temperature has been continuously below 0 C for at least some years these zones can be subdivided into intermittent (discontinuous) and continuous zones. Only intermittent zones are prevalent in Saskatchewan. There are some relic zones within the boreal forest which date to colder times. The degree of disturbance or instability ground is directly proportional to a function of moisture (ice) content.

Recreational Important Areas:

Important recreation areas refer to those ares that have been assessed by professional recreation planners as being valuable for outdoor recreation, either now or in the future. Officially designated recreation areas include areas identified under the Regional Parks Act, R.S.S., 1979, c.26 and The Provincial Parks, Protected Areas and Recreation Sites and Antiquities Act, R.S.S., 1965, c.54

Salvage Excavation:

Archaeological excavation which is carried out in the normal scientific manner, but which is conducted because the site involved is in danger of destruction as a result of human actions or the erosional forces on nature. This archaeological research is generally conducted in emergency situations in which a relatively short period of time is available to complete the work.

Timber:

Refers to Crown and private timber. Timber growing on provincial lands is deemed to be

crown timber.

Visually Sensitive Areas:

Visually sensitive areas are areas which are seen by a relatively large number of persons within a certain time period, or they are scenic areas which are highly visible. Examples of scenic areas which are seen daily by a large number of people include roadsides and areas at curves in roads where vehicle operators look deeply into the landscape. Ridge lines and shore lines are examples of areas which are highly visible, either presently or potentially.

Watercourse:

A lake or stream with defined channel and banks, including both natural lakes and streams as well as artificial impoundments and constructed channels. Water flow may be continuous or intermittent (flowing only at certain seasons of the year) and watercourses, may be classified as:

i) Class I Watercourse: A small lake, steam, or channel that has a gross drainage area of less than 50 km^2 (20mi^2) and lacks commercial or game fish species.

ii) Class II Watercourse: A larger lake, stream, or channel with a gross drainage basin area of more than 50 km^2 (20mi^2) or a stream or lake possessing commercial or game fish species on at least a seasonal basis.

Watercourse Reservations:

A strip of undisturbed vegetation along a stream or lake, left to protect the water body from the effects of operations on adjacent land. Reservation width is measured on each side of the stream from top of the actual streambed bank, or on lakes, from the lakeward edge of terrestrial vegetation.

Wetlands:

A general term to describe wet, poorly drained areas; often described as either bog, muskeg, fen or marsh. Bog forms where surface water is stagnant and acid, encouraging the proliferation of peat mosses which may, in time, support open stands of small black spruce and tamarack. Such treed bog is usually called "muskeg". Fens are composed of less acid peat-forming mosses and sedges which colonize surfaces where water seeps slowly over gentle slopes. They frequently develop a surface pattern of raised organic ridges with intervening wet troughs, i.e., "string fens" or "string bogs". An open cover of tamarack, willow and birch is usual in the drier fens. Marshes can occupy silted areas along the fluctuating margins of northern rivers and lakes, and are characterized by sedges, rushes, cattails and reeds. Prairie marshes and "pot hole sloughs" represent another type of wetland, found in isolated depressions across cultivated and aspen parkland regions of south Saskatchewan.

Wilderness:

Wilderness is a place where people are visitors who do not remain; nor do they leave perma-

nent support systems for their lifestyle.

Wildlife:

Means wildlife as defined in the Wildlife Act, R.S.S., 1979, cw-13.1 and Regulations.

Appendix H Definitions

Adequacy

The ability of the electric system to supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.

AEUB

Alberta Energy Utilities Board. The regulatory agency in Alberta responsible for ensuring that the discover, development and delivery of Alberta's resources take place in a manner that is fair, responsible and in the public interest.

Availability

A measure of time a generating unit, transmission line, or other facility is capable of providing service, whether or not it actually is in service. Typically, this measure is expressed as a percent available for the period under consideration.

Bulk Electric System

A term commonly applied to the portion of an electric utility system that encompasses the electrical generation resources and bulk transmission system.

Capacity

The rated continuous load-carrying ability, expressed in megawatts (MW) or megavolt-amperes (MVA) of generation, transmission, or other electrical equipment.

CSA

Canadian Standards Association. A not-for-profit, nonstatutory, voluntary membership association engaged in standards development and certification activities. CSA standards reflect a national consensus of producers and users and are used widely by industry and commerce. CSA standards are often incorporated into government regulation, particularly in the fields of health, safety, building construction, and the environment.

Clearances

Minimum distance maintained between a transmission line and buildings primarily for safety purposes.

Baseload Capacity

Capacity used to serve an essentially constant level of customer demand. Baseload generating units typically operate whenever they are available, and they generally have a capacity factor that is above 60%.

Peaking Capacity

Capacity used to serve peak demand. Peaking generating units operate a limited number of hours per year.

Cogeneration

Production of electricity from steam, heat, or other forms of energy produced as a by-product of another process.

Demand

The rate at which electric energy is delivered to or by a system or part of a system, generally expressed in kilowatts or megawatts, at a given instant or averaged over any designated interval of time. Demand should not be confused with Load.

EIA

Environmental Impact Assessment.

EIS

Environmental Impact Statement.

Electrical Energy

The generation or use of electric power by a device over a period of time, expressed in kilowatthours (kWh)or megawatthours (MWh).

Electric System Losses

Total electric energy losses in the electric system. The losses consist of transmission, transformation, and distribution losses between supply sources and delivery points. Electric energy is lost primarily due to heating of transmission and distribution elements.

Electric Utility

A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation, transmission, distribution, or sale of electric energy primarily for use by the public and is defined as a utility under the statutes and rules by which it is regulated. Types of Electric Utilities include investor-owned, cooperatively owned, and government-owned (federal agency, crown corporation, state, provincials, municipals, and public power districts).

EMF

Electricity produces two types of fields; an electric and magnetic field. These fields are also referred to as EMF. EMF are at the extremely low end of the electromagnetic field and do not break molecular bonds. It has not been proven that low frequency EMF originating from transmission lines cause adverse biological effects.

Expropriation

A process of acquiring a portion of land, typically from a private landowner, on which a public utility, such as highway, transmission line, gas pipeline etc. is constructed for the benefit of the public as a whole. Expropriation is used when the public utility company or government agency proposing a project and the landowner cannot reach an agreement on land acquisition. Expropriation powers are held by all jurisdictions in Canada and the United States and are used as a last resort following all attempts to negotiate land acquisition with landowners.

Forecast

Predicted demand for electric power. A forecast may be short term (e.g., 15 minutes) for system operation purposes, long-term (e.g., five to 20 years) for generation planning purposes, or for any range in between. A forecast may include peak demand, energy, reactive power, or demand profile. A forecast may be made for total system demand, transmission loading, substation/feeder loading, individual customer demand, or appliance demand.

Generation (Electricity)

The process of producing electrical energy from other forms of energy; also, the amount of electric energy produced, usually expressed in kilowatthours (kWh) or megawatthours (MWh).

Ground

A large conducting body (as the earth) used as a common return for an electric circuit and as an arbitrary zero of potential.

Intervenor

As used in this document, refers to an individual or group who provided opinions, either written and/or verbal, to the panel.

ISO 14000

International Organization for Standardization. A group of committees with international representation whose purpose is to establish internationally consistent and uniform application of standards. The ISO 14000 series of standards generally address environmental management issues.

Kilo (k)

A metric prefix meaning 1000.

kW

(Kilowatts) 1,000 watts.

kWh

(Kilowatt hours) KW times hours. A measurement of power and time used by utilities for billing purposes.

Load

The total amount of electricity required to meet customer demand at any moment. The load equation fluctuates depe-ding on electricity use throughout any given day.

Mega (M)

A metric prefix meaning 1,000,000.

Megawatt

1,000,000 watts

Metering

The methods of applying devices that measure and register the amount and direction of electrical quantities with respect to time.

Milli (m)

A metric prefix meaning one thousandth of a unit.

North American Electric Reliability Council (NERC)

A not-for-profit company formed by the electric utility industry in 1968 to promote the reliability of the electricity supply in North America. NERC consists of nine Regional Reliability Councils and one Affiliate whose members account for virtually all the electricity supplied in the United States, Canada, and a portion of Baja California Norte, Mexico. The members of these Councils are from all segments of the electricity supply industry investor-owned, federal, rural electric cooperative, state/municipal, and provincial utilities, independent power producers, and power marketers. The NERC Regions are: East Central Area Reliability Coordination Agreement (ECAR); Electric Reliability Council of Texas (ERCOT); Mid- Atlantic Area Council (MAAC); Mid-America Interconnected Network (MAIN); Mid- Continent

Area Power Pool (MAPP); Northeast Power Coordinating Council (NPCC); Southeastern Electric Reliability Council (SERC); Southwest Power Pool (SPP); Western Systems Coordinating Council (WSCC); and Alaskan Systems Coordination Council (ASCC, Affiliate).

Reliability

The degree of performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. Reliability may be measured by the frequency, duration, and magnitude of adverse effects on the electric supply. Electric system reliability can be addressed by considering two basic and functional aspects of the electric system Adequacy and Security.

Right-of-Way

The land area that is required and cleared for a transmission line. The right-of-way, sometimes referred to as ROW, must be wide enough to meet clearance criteria. Right-of-ways for transmission lines vary from 30 m to 60 m depending on the size of line and structures. Some rights-of-way are located at the edge of highway.

Route

The location of a transmission line generally in the middle of a right-of-way or along the edge of existing rights-of-way such as roadway or other utility easements.

Route Corridor

Route corridors are linear tracts of land marking the general location of a proposed transmission line. Corridors are selected by using maps and aerial photographs and vary in width and generally are from 400 m to 1,600 m wide. The width of a corridor is required to accommodate changes to the alignment of a transmission tower which may result from the identification of constraints from field studies and which were not evident on the maps and aerial photographs. The vegetation of a corridor is not cleared; only the ROW is subject to disturbance.

Security

The ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements.

SERM

Saskatchewan Environment and Resource Management.

Study Area.

In reference to transmission lines, a study area is typically a rectangular area which encloses the two end points of a proposed transmission line. The study area encompasses enough area to consider alternative route corridors. The study area is reduced in size as constraints to the transmission line location are identified.

Transformer

A static electrical device which, by electromagnetic induction, regenerates AC power from one circuit into another. Transformers are also used to change voltage from one level to another. This is accomplished by the ratio of turns on the primary to turns on the secondary (turns ratio). If the primary windings have twice the number of windings as the secondary, the secondary voltage will be half of the primary voltage.

Transmission

An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it is transformed for delivery to customers or is delivered to other electric systems.

Bulk Transmission

A functional or voltage classification relating to the higher voltage portion of the transmission system.

Subtransmission

A functional or voltage classification relating to the lower voltage portion of the transmission system.

Transmission Constraints

Limitations on a transmission line or element that may be reached during normal or contingency system operations.

Voltage

The electrical force or potential that causes a current to flow in a circuit (just as pressure causes water to flow in a pipe). Voltage is measured in volts (V) or kilovolts (kV). 1 kV = 1000 V.

Watt

The scientific unit of electric power; a rate of doing work at the rate of one joule per second. A typical light bulb is rated 25, 40, 60 or 100 watts. A horse power is 746 watts.

Wheeling

The contracted use of electrical facilities of one or more entities to transmit electricity for another entity.

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